# CONTENTS.


## EDITORIAL NOTES.

GAS, &c.—

Condensation and Naphthalene . . . . 721
Publicity . . . . . 721
The Scrubber-Washer Experience at Stalybridge . . . . . 722
Advice to the Juniors . . . . . 722
Pressures and Other Matters at Dalkeith . 722
Cheaper Gas at Devonport — Municipal Undertakings at Nottingham—Municipal Gas-Works Results—Payment of Councillors . . . . . 723

## INSTITUTION OF GAS ENGINEERS.

ANNUAL MEETING IN GLASGOW—

Presidential Address of Mr. Alex. Wilson, of Glasgow. . . . . 725

Gas Stock and Share Market . . . . . 724
Personal . . . . . 734
Electricity Supply Memoranda. . . . . 735
Coronation Illuminations . . . . . 736
Austro-Hungarian Gas Association . . . 737
Victorian Gas Managers' Association—Papers and Discussions at the Fifth Annual Meeting . . . . . 738
Waverley Association of Gas Managers—Annual Meeting in Edinburgh—
Presidential Address of Mr. R. W. Cowie . 742
The Arrangement of Show-Rooms . . . 746
Manchester Junior Association at Blackpool. 747
Otto-Hilgenstock Bye-Product Process . . 748
Association of Dutch Gas Engineers . . . 749
The Hamburg Gasholder Accident . . . 749
New Pumping-Station at Walton-on-Thames 749

## CORRESPONDENCE.

The Explosion of a Washer-Scrubber at Stalybridge . . . . . 751
Cost of Manufacture and Selling Prices of Gas at St. Helens and Widnes . . . . 751
Automatic and Control Distance-Lighting of Gas-Burners . . . . . 751
Analyzing Small Samples of Gas . . . . 752

## LEGAL INTELLIGENCE.

Johannesburg Gas Plant Contract Litigation. 752

## MISCELLANEOUS NEWS.

Nottingham Corporation Gas Undertaking—The Past Year's Working; Record Carbonizing and Selling Results . . . . . 752
St Helens Corporation Gas Undertaking . 753
Devonport Corporation Gas Undertaking—The Past Year's Working . . . . . 754
West Bromwich Gas Supply. . . . . 754
Cannock Gas Provisional Order . . . . 754
Stockport Gas Coal Contracts . . . . . 755
Workington Corporation Gas Undertaking . 755
Dundee Corporation Gas Undertaking . . 755
Neath Corporation Gas Undertaking . . . 755
Gas and Electricity at Stafford . . . . . 756
Wrexham Electricity Undertaking. . . . 756
Gas Stock and Share List . . . . . 756
Bahia Blanca Gas Company, Limited . . . 757
Thorium Price-Maintenance Scheme . . . 758

## MISCELLANEOUS NEWS (*continued*)—

Notes from Scotland . . . . . 758
Current Sales of Gas Products . . . . . 760
Coal Trade Reports . . . . . 760
Tar Products Prices . . . . . 762

## PARAGRAPHS.

Rotary Gas-Washer—"Transactions" of the Association of Water Engineers . . . . 724
"Field's Analysis" for 1910—Agitation among Milan Gas-Workers — Rendering Coal-Tar Hydrocarbons Soluble in Water . 737
Heating and Ventilating Congress at Dresden—General Meeting of the Association of German Engineers—Répertoire des Industries Gaz et Electricité—Canadian Gas Association . . . . . 746
Gas at the Coronation Exhibition . . . . 749
Bollington District Council Gas Department—Gas Explosion at Nottingham—Price of Gas at Bangor (Co. Down)—Profits at Birkenhead 752
Cowes Gas Supply—Middleton Gas-Works Results . . . . . 754
Devonport Water Undertaking—Procedings against the Llanelly Gas Company—Details of Hot-Water Work—Suicides by Gas . . 755
Hebden Bridge and Mytholmroyd Gas Board 759
A Good Surplus at Bradford—A Burst Main at Saltley—Nottingham Corporation Water Department—Reductions in Price at Bury and Oldham . . . . . 761
Reduction in Price at Downham—Record Year at Carlisle—Finding a Gas Escape with a Light . . . . . 762



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## EDITORIAL NOTES—GAS, &c.

### Condensation and Naphthalene.

THE modern high temperature methods of carbonization, the practical elimination of illuminating power as a necessary quality of gas through the altered means of utilizing it, and the newer purposes for which it is used, have had effects so far reaching that few have really properly realized them. M. Laurain has, in the paper he read before the Société Technique du Gaz (*ante*, p. 602), indirectly called attention to how the altered conditions of the gas industry largely, if not completely, reverse the teachings of the past; and he whets the appetite somewhat for more information as to the actual results to be obtained by submitting gas to a somewhat rapid cooling almost immediately after it leaves the retorts—a thing that is so heterodoxical that the very suggestion will make many turn from it in almost a contemptuous mood. But let us mention two or three points with the object of having the matter considered, as it deserves to be considered, in view of the changed circumstances, and the fact that, at the bottom of the work described in the paper, is M. Sainte-Claire Deville.

The old teachings and current practice follow the lines of a gradual cooling of the gas in the system of pipes—hydraulic main, foul main, and so forth—that succeeds the retorts; the heavier tar is removed in the system; and the deposition of some of the naphthalene and lighter hydrocarbon contents of the gas is obviated by permitting it to travel forward with the lighter tars until the reduction of temperature eventually causes the lighter tars to deposit. Now the higher carbonizing temperatures have largely raised the temperature in the system of mains immediately succeeding the retorts, with the result that there is not the same gradual cooling that there was—in short, the foul main is altogether less efficient in condensation than it was in the pre-high temperature days. That is one change; and the other is that now that illuminating power has fallen from its high estate, and a lower grade of illuminating gas is being made, there is not the same forcible argument against a little deposition of the lighter hydrocarbons, and in proportion the deposition would be smaller now than it was formerly in view of the fact that the gas is not so rich in the condensable light hydrocarbons. Therefore, a more immediate cooling of the gas than formerly would not cause such an amount of impoverishment as was at one time feared. In considering this particular aspect of the matter in conjunction with M. Laurain's paper, we may remind readers that M. Sainte-Claire Deville has made an extended study of the removal of the light hydrocarbons of gas by subjecting them to low temperatures; and that he gave in one of our French contemporaries as far back as 1889 some account of his labours in this particular direction.

The condensation trials that M. Laurain describes in his paper have been carried out at the experimental station of the Paris Gas Company at La Villette. The lines of the work are quickly appreciated if certain principles that M. Sainte-Claire Deville has laid down are embedded in one's mind. In the first place, condensation should be organized with the view of minimizing the percentage of naphthalene in the gas. Next, the natural absorbing agent of naphthalene is the vesicular tar in suspension in the gas at the outlet of the hydraulic main; and this vesicular tar acts most effectively *when cold*. Therefore, the condensation process must be so arranged that no particle of this precious solvent will be separated from the gas before being put into equilibrium with it at the lowest temperature. Thus the gas must be rapidly and completely cooled as it leaves the hydraulic main—in other words, the deposit of the vesicular tar must be hastened by the introduction of a cooling condenser fed by cold water as near as possible to the retorts, in order to prevent the loss of the portion which, under the ordinary conditions of working, is deposited in the mains immediately succeeding the retorts and flows to the syphons, and thus does not fulfil its function as a cold solvent for the naphthalene vapours. What M. Laurain calls a "refrige-"rator" is fixed in proximity to the retorts, with as short a length of pipe as possible between it and the hydraulic main. In the "refrigerator" a current of cold water ascends, and through this the gas rises. The average requirement of cooling water appears to be equal to about 12½ gallons per 1000 cubic feet. On leaving the "refrigerator," the gas is freed as soon as possible from the tarry bubbles; the gas-mains between it and the impact condensers being protected against the effects of possible heating, which would restore to the gas some of the naphthalene absorbed by the cooled tarry vesicles. After the gas leaves the latter, it is claimed that the diameter and length of the mains will have no further effect on the percentage of naphthalene, no matter the change of temperature it may have to undergo.

Those who are still troubled with naphthalene, and have not had recourse to the other well-known expedients to obtain relief from their troubles, will wonder whether a reversal of their condensation beliefs and practices will give them freedom. There will be comfort for them in the assurance that the rapid cooling has a very moderate effect upon the benzol and the lighter hydrocarbons in the gas—to nothing like the extent that it has been imagined in other days and under other circumstances would be the result of such treatment. But we should like to know something more as to the character of the gas upon which the trials have been made at the experimental works at La Villette. Another point that is noticed is that the tar is fluid, and is not congealed by the naphthalene it contains. M. Laurain's paper is a notable contribution to the subjects of condensation and naphthalene; and it does offer inducements to a trial of this departure from one of the accepted doctrines of the past.

### Publicity.

WHILE publicity is in the air in the gas industry, it will be useful to keep an eye on the proceedings of the Electricity Publicity Committee. The members held their annual conference the other day, with Mr. H. B. Renwick presiding. The first thing in conjunction with the meeting that is worth observing by those Gas Departments of municipal authorities who are hanging back—not from any want of sympathy, but from some lurking fear that their action in making contribution to the gas publicity movement might be misinterpreted by interested folks near home—is that on this Electricity Publicity Committee there are representatives of both company and municipal concerns. At the meeting, the Chairman and delegates present were congratulating themselves on the happy co-operation between the municipal and company undertakings; and there was a free expression of the hope that the co-operation might be extended to several other useful directions. We cannot find any valid cause why, both in gas and electricity, there should not be a fusion of activities between the privately owned and the municipally governed undertakings. From the beginning to nearly the end of their affairs, interests are mutual. The main point, however, to be marked by municipal gas undertakings is that the spirit of co-operation has commenced its work in the electricity industry; and therefore it may be taken that it will continue to grow.

The second matter to be noted is that, in addition to advertising, there have been purchased from the Committee during the year pamphlets, circulars, cards, &c., to the number of nearly 1½ millions; and they have been bought for distribution not only through the United Kingdom, but in the Colonies and other places abroad. From this point of view, the result is said to be perfectly satisfactory. But we notice that Mr. Renwick did not in any way dissect the circulars, leaflets, &c., and tell the members how many of the 1½ millions contained the most virulent slanders of gas,

recourse to which as a line of policy does not redound to the credit of the electricity publicity movement, to that of those who are responsible for the production of the slanders, nor to that of those who are responsible for their circulation. We criticized the character of some of this literature on Feb. 21 last (p. 511); but there has not since been a word of reply or defence from Mr. Renwick or his associates. The action of the Committee in this connection amounts to a confession that, in their opinion, it is necessary for the electrical industry to attempt to trade on ignorance.

There is a peculiar readiness to attack reports as to electrically generated fires on the part of the Committee, unless the cause is so abundantly clear that it would only make Mr. Renwick and his colleagues look very ridiculous to attempt to lift the responsibility from electricity. The recent appalling disaster at the Edinburgh Music Hall, in which electricity was caught in the act of initiating the fire, is a case in point. We have not observed any contradiction from Mr. Renwick of the stories of eye-witnesses; and there has indeed been a very guarded silence over the matter in electrical quarters. Those present at the annual meeting of the Committee were told that signal service has been done in the newspapers in connection with the various erroneous reports to which currency has been given in the Press in regard to the causes of fires; and furthermore the interests of electricity have been generally upheld in the Press by the Committee. According to the very abbreviated report of the proceedings that has appeared in the electrical papers, the Committee were heartily slapped on the back for what they have done in the course of the year; but there is nothing said as to a word of remonstrance having been uttered over the scandalous statements that were issued regarding gas.

There is no doubt whatever that something was said at the meeting concerning the joint publicity movement in the gas industry; but, if so, it was suppressed in the carefully edited report sent to the electrical papers for publication. But to encourage the coming in of fresh adherents to the electricity publicity work, there was much said about the extended programme the Committee have before them for the current year—among the new productions being large-sized posters. Various speakers bore testimony to the good effect that the labours of the Committee have had upon the fortunes of the electricity industry—more particularly through the advertising propaganda; and suggestions were made as to new openings for the exercise of the Committee's energies. The existence of the Electricity Publicity Committee is one of the best possible reasons for a strong and virile, well organized and financed, Committee for the gas industry with similar aims and objects—*minus* the bad and weak points, which are the plainest of all indications of the pressure the Electricity Publicity Committee suffer in the campaign against gas.

## The Washer-Scrubber Experience at Stalybridge.

A LETTER appearing in our "Correspondence" columns to-day from Mr. H. King Hiller gives an account of an occurrence at the Shanghai Gas-Works the incidents of which have such close approximation with those that led up to the fatal explosion of a washer-scrubber at the Stalybridge Gas-Works, that the matter seems one demanding further investigation to ascertain whether something cannot be done in the construction of these indispensable machines to prevent the formation of iron sulphide in their interiors. For this Shanghai experience (the details of which the comments of last week have brought to light) seems to point somewhat distinctly to it being a confirmation of the theory put forward by Professor Harold B. Dixon and Mr. S. Meunier as a result of the investigation of the Stalybridge affair.

In the case described to-day by Mr. King Hiller, it was a "Standard," and not a Walker, washer-scrubber. After the machine had been in service a short time, it was observed that, when the tar was run off, there was a scaly deposit left in the trough. This was removed and placed on one side; and when it became dry, it fired spontaneously. Our correspondent's examination led him to the conclusion that the deposit was composed of sulphide of iron, naphthalene crystals, and tar. Then came a stoppage in the run-off pipes. The manhole cover of one compartment was consequently removed, and the pipes were cleaned out, but the cover was not immediately replaced. All of which shows there was no suspicion of danger. But within a couple of hours of the exposure to the air, the washer was on fire, which was extinguished, by pouring water upon it from a hose, before replacing the cover. The following morning, an inspection of the damage was being made by our correspondent, when a whitish vapour began to rise again from the interior, and the temperature appreciably increased. The washer was again flooded before the cover was replaced. The flooding before replacing the cover may have saved an experience similar to that at Stalybridge.

However that may be, the Shanghai and Stalybridge facts have direct correspondence. Like Professor Dixon and Mr. Meunier, Mr. King Hiller is persuaded as to the cause. There was a deposit of sulphide of iron in thin flakes on the washing plates; and when a current of air was admitted to the machine, rapid oxidation was set up to such an extent that spontaneous combustion occurred. It seems to us there is, in these common experiences between East and West, a genuine claim to further inquiry—remembering that one life has been lost—to see whether the formation of the iron sulphide cannot be frustrated. A curious aspect of these occurrences is—considering the hundreds of washer-scrubbers there are in use in this country and elsewhere—that similar incidents have not been reported. They may have been experienced, dealt with, and there allowed to remain. This was the case at Amsterdam, as mentioned by Heer J. van Rossum du Chattel in the letter appearing in our "Correspondence" columns, in which he emphasizes the utility of bringing under notice all the facts connected with these matters.

## Advice to the Juniors.

EXCELLENT words of counsel were given to the members of the Manchester Junior Association on their visit to the Blackpool Gas-Works last Saturday week. In a progressive industry such as that of gas, the true practitioner never acknowledges that he has finished learning. So long as there is development upon development—in the works, in the distribution system, in the modes of utilization, and in the methods of trading—and so long as there is change in the circumstances under which trading is conducted, there can never be an end to the knowledge to be acquired. Mr. John Chew has a son and a grandson in the same business as that with which he has been so honourably associated from very small beginnings; and the fact in itself tells without the use of words of a long career in the one service. But, nevertheless, there is one thing that is strongly engraved on the mind of the veteran gas engineer and manager, and it is that he has not finished imbibing all the knowledge there is to be gained about the gas business. He is still a learner, and will be so to the end. If the idea obtained prevalence that the fount of knowledge in regard to gas affairs had ceased to flow, then says Mr. Chew progress would cease. He is right; and his warning against allowing such an idea to take root will have its effect among those who heard it. There is this to be said, that the primary principle of our junior organizations is the acquisition of knowledge; and we feel that these organizations will do as much as, if not more than, anything else to implant and cultivate a desire for a wider knowledge that will continue to have its influence throughout active service in the gas industry. Yet it is good for the members to receive the advice from lips of long experience. "Learn all you can "about the business. Avail yourself of all the knowledge "you can get, and make yourselves as proficient as possible." In business, as in other walks of life, knowledge is power; and the more of such power that is brought to bear upon the competition of the times, the better. With electricity, Mr. Chew has had a stiff battle at Blackpool. Even so, the Gas Department are selling more gas in the town than ever; their day load being at present much heavier than the night load. Such a condition would not have been accomplished by sitting still; nor by knowledge lagging in the rear of the times.

## Pressures and Other Matters at Dalkeith.

THERE was a good deal that was interesting about pressures in the address that Mr. R. W. Cowie, of Dalkeith, delivered at the meeting of the Waverley Association last Friday. District Associations are the places at which to bring forward unusual experiences, and to discuss them. It is not given to every gas manager to have a Dalkeith Palace to supply, nor a single patron who uses gas for domestic purposes by the thousands of cubic feet in the twenty-four hours. Mr. Cowie has this stately place to supply; and,

in connection with it, he has had special experience. The occupiers of palaces are only human; and they take an interest in the affairs that are of the commonplaces of daily life. Even the gas supply may cause them discontent and vexation; and Mr. Cowie shows that the antithesis of both can be produced, and satisfaction be completely re-established, by going to work in the right way. But the problem in relation to this palace that had to be tackled, and has been successfully tackled by him, was a somewhat difficult one. The cumulative growth of incompatibles generally results in something of the kind.

The large establishment was piped for gas at a time anterior to the manifold uses to which gas is now put; but the convenience and labour-saving of gas cooking-tables, of laundry appliances, and so forth had to be introduced into the ducal residence as being in accord with the advances of our times. But there were the walls of the palace for which there had to be respect. Therefore, to meet the additional demands upon its gas-carrying capacity, the piping of the building could not be reorganized and enlarged. The inevitable result was complaint of want of pressure; and it seems to have been a perennial condition that could not be tolerated. But a new main, compressing plant, and governors have converted the conditions from the intolerable to the perfectly satisfactory; and the piping within the Palace has not been touched. There is now no complaint. The Company have a contented and influential consumer; and, as a result of the provision of higher pressures, they have now a smaller account to collect from him. The fact, however, is regarded very philosophically. Mr. Cowie mentions that on comparable days in 1909 and 1910, before and after the institution of higher pressures, the consumptions were respectively 11,250 and 6600 cubic feet. There is nothing very curious about this. A large proportion of the gas is used for heating purposes; and for these there is nothing so wasteful as an insufficient pressure. A good uniform pressure at the point of use saves time and gas.

There is another point about pressures; and it is that Mr. Cowie finds the wet meters in the district have become unsatisfactory with the increase of the district pressure; and he has had some difficulty in getting the landlords to supply dry ones. Custom presents us with curious appearances and situations at times; and it strikes us as a bit curious to expect a landlord to supply the means of measuring the commodity sold by the gas company, and purchased and used by the tenant. It seems, however, that the Dalkeith Gas Company do not provide meters, other than prepayment, and these only on certain occasions. There are gas undertakings that decline to supply cookers or gas-fires in any other form than on hire-purchase or purchase outright; and the policy does not commend itself to us on considering the trend of business development in the industry. But for a company not to supply meters!——well, we will leave it at the expression of surprise.

Carbonization has a small place in the address; and the vertical retort is looked upon as the inevitable successor of the horizontal and inclined retorts in large gas-works. The view would have been more appropriate a time ago, before the horizontal retort showed that gas engineers had not adequately measured its inherent productive flexibility. But there is no doubt that the vertical retort will occupy a very large place in the carbonizing equipment of the future; and not only in large works but in small ones. The trial settings that have been in use are sufficient guarantee that a high carbonizing efficiency can be secured by small units, though not so high, naturally, as by large units. Therefore, the managers of small works need not fear that it can only be by their translation to more influential posts that they will be brought into intimate contact with the most modern of carbonizing plant.

## Cheaper Gas at Devonport.

Devonport is to be congratulated on the fact that it is to have cheaper gas. This is not only a good thing for the consumers, but is an unmistakable sign that the gas undertaking has emerged from the difficulties which so long beset it. It may be true that those in present control of the undertaking are reaping where others have sown, and that the policy pursued by the Gas Committee in one year is not very different from that followed in another. Circumstances, however, vary; and it may be that the present Committee and their Engineer have been more fortunate in avoiding difficulties than those who preceded them. One thing in their favour has been the fact that coal and oil have been cheaper in the last year or two than at any time since the Corporation took over the gas-works. Moreover, steps have at last been taken to really grapple with the problem of reducing the cost of manufacture. Ever since the Corporation acquired the undertaking, they have been engaged in reconstructing the works; and now, in remodelling the retort-benches, they are beginning to reap the reward of their large expenditure of capital. So marked an improvement has already been effected that Alderman Tozer, the Chairman of the Gas Committee, is looking forward to greater economies in the future, and to further reductions in price, not only next year, but for a series of years. Indeed, he thinks a time is coming when Devonport may have gas even cheaper than Plymouth. When that day arrives, the borough will indeed be proud of itself; for if Devonport has an ambition, it is to be not second to Plymouth in anything.

## Municipal Undertakings at Nottingham.

Further substantial proof, if it were needed, is forthcoming of the revenue-earning powers of the Nottingham Corporation gas undertaking. The report which has just been issued, and which is noticed elsewhere, shows the possibility of applying this year £32,000 in aid of the rates; and it is significant that the net profit of £47,142 has been realized in a period in which greater demands have been entailed on the financial resources by reason of a diminution in the price charged to the consumers and an increase in the wages of the employees. It is not difficult to realize that but for the help afforded by the municipal trading concerns, the burden of Nottingham's already heavy district rate would be almost insupportable. While the gas undertaking has afforded the lion's share of the relief, other important branches of civic enterprise have come prominently into the picture, notably the tramways and electricity undertakings, which have each for some years helped materially to swell the available surpluses. In this sense also the water undertaking, which had long been but of a poorly remunerative character, is now appearing to greater advantage in the accounts; a profit of £21,122 having been made last year, or nearly three times the amount gained six years ago—the balance in 1905 being only £7317. Having regard, however, to the heavy liability accruing under the Derwent Valley water scheme, it is impossible for the ratepayers to anticipate, at any rate for the present, reaping any profit from water supply. Meanwhile, the gas, tramways, and electricity funds stand them in admirable stead. The first named has for years been a continuously steady contributing factor. From the tramways nothing was paid in aid of the district rate until 1900; nor was there any carry-over to the reserve fund until the following year. Since then, however, there have been large increments yearly available. The total which it is proposed to take on this occasion from the gas and tramways amounts to no less than £47,000, of which gas contributes £32,000; and to this has to be added £15,350 contributed in aid of the rates out of the profits from the supply of electricity. The figures for the last septennial period afford striking proof of the rate-relieving powers of the Nottingham concerns; the amounts voted from the profits of the several undertakings in reduction of local burdens being as follows: 1904—Gas, £28,300; electricity, £6000; tramways, £13,000. 1910—Gas, £35,000; electricity, £16,700; tramways, £20,000.

## Municipal Gas-Works Results.

Since reference was last made to the results of the working during the past financial year of gas undertakings in the hands of local authorities, many more reports have come to hand; and it is pleasing to note that, like the earlier ones, they are of a highly gratifying character. At Birkenhead, there is a net profit of £25,000. The average make per ton at Bollington was 11,660 cubic feet, as compared with 10,810 cubic feet the previous year. A reduction has been made in the price of gas; and, in addition to a small sum being handed over in relief of the rates, the street lighting was provided free of cost. The Bolton Town Council have approved of a decision of the Gas Committee to allocate £20,000 out of profits in aid of the rates, and to carry £6500 to the credit of the reserve fund. There is at Bradford a net profit of £12,935, which compares with a deficit for the previous year of £737. There has been a substantial increase in the income from the sale of gas, as well as in the receipts from bye-products. It

has been a record year at Carlisle; the gross profit, of £14,020, being £1000 more than was the case in the previous highest year. A net profit of £4287 has been realized at Devonport; and the Gas Committee therefore decided to recommend to the Town Council a reduction of 2d. per 1000 cubic feet to the ordinary consumers, with an equivalent of 2d. to slot-meter users, and other concessions. There was an increase of 3·7 per cent. in the gas sold. Lancaster reports that the net cost of the gas produced was 9·49d. per 1000 cubic feet, which constitutes a record for the works. A sum of £3600 is contributed to the relief of the rates; and the gas supplied free of charge to the public lamps represents a further contribution to the rates of £1652. There was a small increase in the quantity of gas made. Neath hands over a sum of £1000 for the relief of the rates.

The results at Market Harborough are regarded by the Council as highly satisfactory; there being a net profit of nearly £1000. The statement of affairs at Nottingham shows that the make of gas per ton of coal carbonized, at 11,480 cubic feet, was 284 cubic feet more than in the previous year; while the gas sold per ton increased from 10,692 cubic feet to 11,029 feet—a figure which, it is pointed out, is by far the highest in the history of the undertaking, and is 1883 cubic feet more than the amount of gas sold per ton of coal carbonized for the year 1902. Unaccounted-for gas has been lessened, until it is now only 3·93 per cent. A sum of £32,000 goes in aid of the rates; and, in addition, reductions in the price of gas were made last year which it is calculated will represent a sum of £11,000 over the complete twelve months. From Oldham, there is reported (subject to audit) a net profit on the undertaking of £23,574, of which £7500 goes in aid of the rates, and £6700 to the reserve fund, to meet extraordinary expenditure. The quantity of gas sent out during the year at Stafford was 211¾ million cubic feet, which compares with 202½ million feet in the preceding twelve months. After deducting charges against net revenue account, and adding the balance brought forward, there is an available balance of £7710, or about £750 less than a year ago. This result has, however, been attained with a reduction, since June last, of 2d. per 1000 cubic feet to all ordinary and prepayment consumers, which has affected the profits to the extent of over £1000. The Committee recommend the handing over of £3500 in relief of the rates. The make of gas per ton was 11,744 cubic feet, of which 11,336 cubic feet were sold. There was a yield of gas per ton of coal at West Bromwich of 11,404 cubic feet, and an increase of over 3 per cent. in the quantity of gas made, as compared with the preceding year. The net surplus is £3740, against £4110; but the small reduction is merely due to the fact that during the past year a large sum was spent on maintenance and extensions and in the distribution departments. When this is taken into account, there is a difference of about £850 in favour of the year 1910-11. At Workington, the make of gas per ton was 11,084 cubic feet, as compared with 10,920 cubic feet in the previous year. The net profit is £1713, against £1539; and it is stated that altogether the results of the year's working constitute a record, and the financial position of the undertaking is in every way sound and satisfactory.

## Payment of Councillors.

The proposal to pay salaries to Members of Parliament has led to a suggestion that similar treatment should be meted out to the members of the Liverpool City Council; but it may be added that the matter was not taken up very seriously. The discussion arose on a motion "that in the event of the Budget resolution relating to the payment of Members of Parliament becoming law, it be an instruction to the Finance Committee to formulate a scheme, and prepare a Bill for legalizing the payment of members of the Council of the City of Liverpool." Even the mover of the resolution himself admitted that if the principle of payment became law, he would regret it very much, because he felt there would be greater independence and freedom in councils as at present constituted than there would be if the members received payment for their services. It was only in the event of the principle becoming the law of the land that he asked the Council to entertain the idea of any payment for members of the Council. Evidently, his argument was that if one class of member was to be paid, the other class should be also; but at the same time, his own view was that in neither case should salaries be given. Was one of the supporters of the motion in the Council correct when he asserted that the only object of the resolution was to cast ridicule upon the payment of Members of Parliament? Perhaps it is not necessary to express an opinion upon this point. It is sufficient to note that the Council as a whole refused to regard the matter seriously. The remarks made partook mostly of the nature of banter; and ultimately a show of hands was taken on the question whether permission should be granted to the mover to withdraw the motion. This was given; and the matter then dropped. The suggestion has been laughed out of court at Liverpool; but possibly no very great amount of surprise would be caused should it sooner or latter be taken up in a more serious spirit in some other quarter.

## GAS STOCK AND SHARE MARKET.

**(For Stock and Share List, see p. 756.)**

THE week just concluded on the Stock Exchange has been a disappointing affair. No market was really strong; and the best of them were provokingly weak without any apparent just cause. A regrettable incident was the stoppage of the Birkbeck Bank; but this was not an influential factor in the markets. Consols more than once touched 79$\frac{13}{16}$, and Railways were much depressed, although traffic and trade prospects are all in their favour. The reopening on Tuesday after the holidays was dispiriting. Gilt-edged lines were weak, and Consols led the retreat with a fall of $\frac{5}{16}$. Rails tried hard to stand firm, but had to give way. Americans, however, did well; and the Foreign Market was pretty steady. Wednesday opened dull. Consols fell; but afterwards they made a sharp recovery, which infused a more cheerful tone. But nothing could relieve the depression of Rails. On Thursday, Consols were back again to the lower level, and other gilt-edged things sympathized; while Rails again were weak. But Americans had a smart rise. On Friday, the general tone was not strong. Consols fell, and then recovered. Railways held tight for a while, and then gave way to realizations. Saturday was very quiet and generally dull. Consols once more were done under 80; and Railways were languid and devoid of strength. In the Money Market, there was a plentiful supply to meet all demands. Discount was easy at first, but tightened considerably before the close. Business in the Gas Market was pretty brisk; and the tone was generally firm all round, coupled with some further moderate advances in quotation. In Gaslight and Coke issues, the ordinary was active and strong. Transactions ranged from 105½ to 106½—a rise of ¼. In the secured issues, the maximum realized 86¼ and 87, the preference 103½ and 104, and the debenture 80¼ and 81¾. South Metropolitan was inactive and without change; all transactions being within the range of 119 and 120. The debenture made 81¾. In Commercials, the 4 per cent. was done free at 114½, and the debenture at 78¾. Among the Suburban and Provincial group, Brentford old changed hands at 259, ditto new at from 205 to 206½ (a rise of 1), British at 43¾, Bromley "A" at 116½, South Suburban at 119½, and (on the Liverpool Exchange) Chester at 110½. Without being dealt in, Ilford "B" rose 2½, North Middlesex ½, and Newcastle ½. In the Continental companies, Imperial was quiet at from 186 to 187½, Union was marked free at 93, European realized from 19 to 19¼, and Tuscan 9$\frac{3}{16}$. Among the undertakings of the remoter world, Melbourne 4½ per cent. was done at 101, Oriental at 138 and 138¾, Primitiva at from 7½ to 7$\frac{13}{16}$, ditto preference at from 5$\frac{7}{16}$ to 5$\frac{9}{16}$, ditto debenture at from 97½ to 98, San Paulo at 20⅛—a rise of ½.

**Rotary Gas-Washer.**—Herr A. Stolte, of Zweibrücken, has taken out a patent for a rotary gas-washer. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," the casing is in the form of two conical drums built out from either side of a central fan casing. A cylindrical drum, mounted on a shaft passing through the casing, carries blades projecting into close proximity with the walls of the fan casing and of the drums. Gas and washing liquid are introduced at both sides of the casing; the gas being drawn off from the periphery of the fan casing in the centre and the liquid from the lower edges of the outwardly inclined drum casings.

**"Transactions" of the Association of Water Engineers.**—We have received Vol. XV. of the "Transactions," containing the reports of the summer and winter meetings held last year under the presidency of Mr. W. H. Humphreys, Assoc.M.Inst.C.E., the Engineer, Manager, and Secretary of the York Water Company. The proceedings at the two meetings were noticed in the "JOURNAL" at the time; but papers appear fully illustrated in the volume under notice. In addition to the technical matter, abstracts are given of legal cases connected with water supply, as well as summaries of the contents and indexes to the subject-matter in all the volumes. The library catalogue, lists of the Council, officers, and Past-Presidents, and a statement of the year's accounts make up the contents. As usual, a portrait of the President for the year serves for a frontispiece. The volume, which contains a record of two interesting meetings, has been produced under the editorship of Mr. Percy Griffith, M.Inst.C.E., F.G.S., the Secretary of the Association.

# THE INSTITUTION OF GAS ENGINEERS.

## ANNUAL MEETING, JUNE 13 to 15, 911.

## PRESIDENTIAL ADDRESS

OF

MR. ALEX. WILSON, M.Inst.C.E., of Glasgow.

Allow me, in addition to the welcome extended to you by the Lord Provost and the Corporation, to express my own gratification that you have accepted so enthusiastically the invitation to visit our City on the Clyde. I trust you will enjoy to the full your excursion to this northern part of the kingdom, and that this meeting of the Institution in Glasgow will prove both pleasant and profitable to all the members; and, might I add, especially enjoyable to the ladies who are honouring us by their company at this time. I would also tender my warm thanks for the honour you conferred on me by electing me to the position I am occupying here to-day.

When nearing the end of a term of office, and looking back over the proceedings of the year, the thought that comes uppermost is that the work, and possibilities for work, by our Institution grow rapidly year by year; and that it is almost impossible for us, however much we may apply ourselves, to feel satisfied with the rate of progress made in dealing with the many questions affecting our industry that are awaiting solution. There are so many problems to be dealt with, that we appear to make but little headway. But possibly, as in former days, the efforts made will yield their fruit in due season.

To many outside our profession, it may appear somewhat strange that there can be any new problems to solve in connection with such an old-fashioned industry as gas manufacture—an industry which, according to some authorities, is dwindling away through loss of business due to competition by up-to-date rivals and inaction on the part of those who have the direction of gas affairs. At least, these prophets would like the public to have this impression in their minds when matters relating to lighting, heating, or power supply are to be considered.

There may be, and no doubt is, good ground for complaint regarding our method, or want of method, in keeping the public in close touch with our business and with the many services we can render so efficiently to our consumers; and something might be learned in this respect from our rivals. [We are looking forward to the work of the Publicity Committee to help us in this important matter.] But, I venture to say, there never was a time since Murdoch invented his "light without a wick," when the manufacture of gas and the methods of using gas to advantage were the subjects of such keen attention and promise as they are at the present day.

### The Effects of Improved Service.

Taking a cursory glance over the accounts of gas undertakings, there does not appear to be the same expansion and percentage increase in sales of gas as were registered at some former periods. Looking into the returns for our own department, I found that, while the figures for the summer months showed good and improving increases, those relating to the winter and night consumption were nearly stationary. The diagrams [on this and next page] will, perhaps, show better than figures the state of affairs.

Now, while the output for the summer seasons is satisfactory, and can be explained by the more extended uses of gas for heating, cooking, and manufacturing purposes, the figures for the winter and night outputs are disappointing. The first impression naturally is that the increase of business from new consumers must be counterbalanced by loss due to competition. On looking more closely into the matter, however, the true explanation was, I believe, found in the better service obtained by our consumers from the use of improved appliances, and, consequently, the lesser quantity of gas required to give the same or even better results. From the examination of a large number of accounts, it appears that, compared with flat-flame lighting which is still much in use, the adoption of ordinary incandescent burners by householders and shopkeepers reduces the quantity of gas consumed for lighting purposes by from 20 to 50 per cent.; while in the cases of a considerable number of large consumers who have installed pressure systems of lighting into their works and yards, the saving in gas runs sometimes to as high as 70 per cent. In view of these large savings by individual consumers, and the great difference in the aggregate which must be caused in the consumption of gas, the wonder is, not that the output during the lighting periods should be stationary, but rather that it should be maintained, and no decrease shown.

No one cavils at these savings by consumers, as the increased value of the service will widen the foundation of our business, and render our position in the future more secure. The many improvements made in burners for ordinary lighting during recent years have not only improved their lighting efficiency, but also their appearance; so that they can now not only be relied on to supply illumination of the most pleasant and economical kind, but the fittings themselves can be designed and obtained to harmonize with all

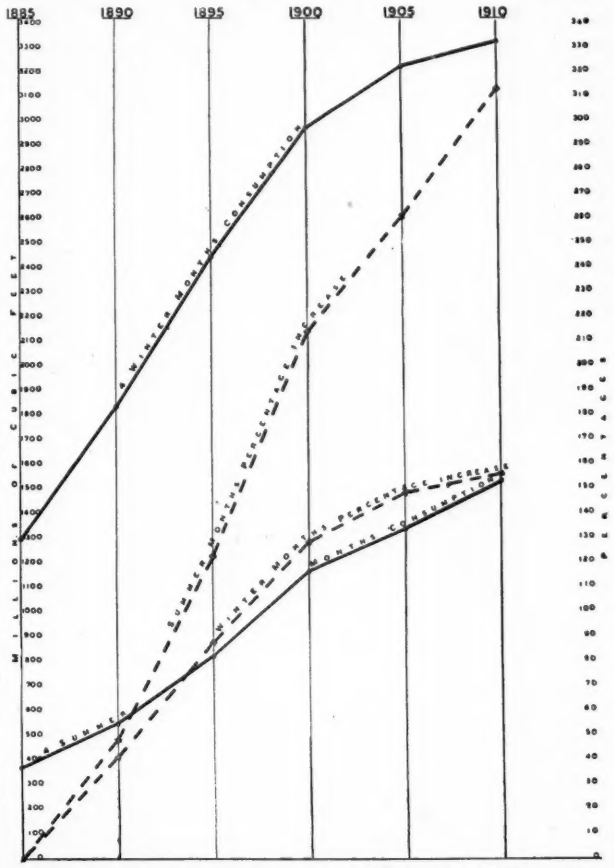
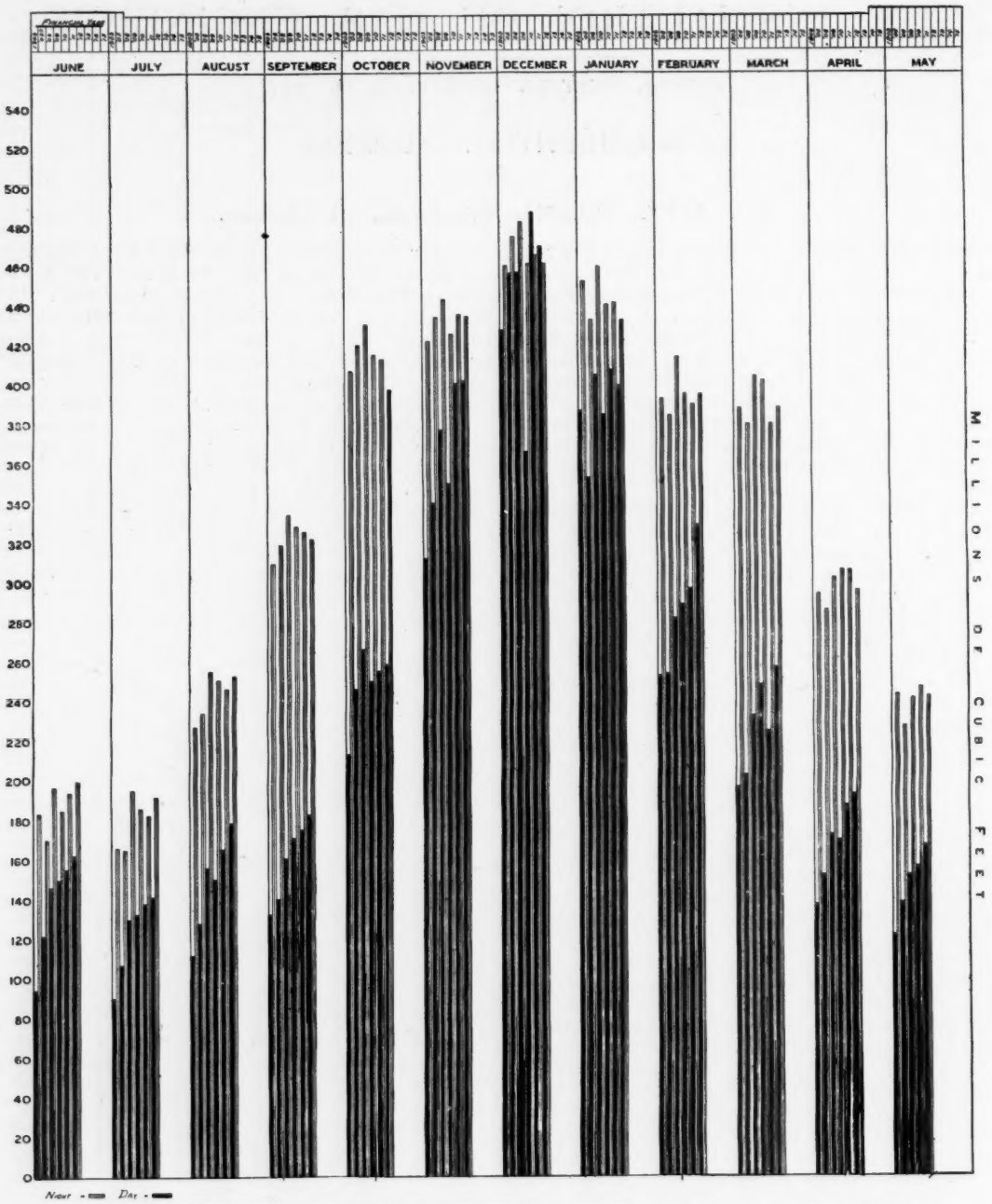



**Diagram showing the Gas Consumed, in Millions of Cubic Feet, and Percentage Increases during the Winter and Summer Months.**

kinds of surroundings and to satisfy artistic tastes. In outside lighting, great progress has been made; and no one who examines the lighting of large cities, and especially of the most important streets of London, or pays a visit to the Crystal Palace, and sees the grand lighting installed there by Mr. S. Y. Shoubridge and his Company, can have the slightest doubt in his mind as to the immense superiority of gas for this special class of lighting. In view of these improvements in lighting appliances, and the great economy of gas resulting therefrom, we need not be surprised if our returns for gas for lighting purposes remain stationary, or even show some decrease, until the substitution of incandescent in its many forms for flat-flame lighting has been nearly completed.

### Heating by Gas.

Although this part of our business may not demand much




COMBINED DELIVERIES—SHOWING THE CONSUMPTION DURING THE DAY AND NIGHT HOURS.

extension of our works for some time, we have, fortunately, another branch which offers full scope for our attention and energies. During recent years, the problem of heating by gas has been the subject of much interesting study and successful experiments; and the manufacture of gas-heating appliances for innumerable purposes has been increasing by leaps and bounds. Not only for manufacturing purposes has gas been found a satisfactory and economical heating agent, but applied to domestic use in the smokeless heating of rooms, heating of water, and for cooking purposes, it is practically without a rival.

The important question of smoke prevention in our large cities and towns, which is bound to receive the serious consideration of all classes, on account of the great injury now known to be done to health and property by the smoke nuisance, is having—and will have more and more—a great bearing on our business. Of course, some of our would-be rivals in the domestic heating field would like the public to believe that the use of gas for house purposes is not hygienic; but the manufacturers of heating appliances have given the best answer to this insinuation by supplying apparatus which is not only reasonable in cost, but efficient in action. As we say in the North, "The proof o' the pudding is the pree'n o't." When we meet with people who are full of fads and fancies about the bad effects of heating by gas, we find it better, instead of having long arguments with them, to obtain permission to instal *just one* of our up-to-date appliances; and it generally proves the best advocate we can employ in our favour. Of course, I am well aware that some of these hostile impressions are deep-seated and difficult to remove; but the success we are all attaining with this class of customer augurs well for a large expansion of our business in the future.

The improvements and inventions made in heating appliances for manufacturing purposes have been numerous and valuable; and, as will be shown by Professor Bone in his lecture to-night, we are likely to have larger extensions in this department. These extensions ought to be fostered with the greatest care; and as the demand for gas used for manufacturing purposes is very regular, and can be produced at the minimum of cost to the gas undertakings, every effort should be made, by quoting the lowest prices possible, to increase our output in this direction.

### GLASGOW GAS UNDERTAKING.

As our meeting is being held in Glasgow this year, and many of our members will, no doubt, visit the various works and departments, some information and thoughts regarding the Corporation gas undertaking may not be out of place.

The Glasgow Gaslight Company, who were the first parties to sell gas in Glasgow, obtained their first Act of Parliament in 1817. The supply of gas was commenced the following

year; and as the demand increased, other works were erected in several districts of the city. In the year 1843, a competing Company—the City and Suburban Gas Company—started, and also obtained parliamentary authority. These two Companies continued to supply gas to Glasgow and the neighbouring burghs until 1869, when the Corporation obtained powers to acquire the undertakings of both the Companies; and since that date the business of the Gas Department has extended rapidly.

In 1874, the works of the Rutherglen Gas Company were taken over. In 1891, the works and business of the Partick, Hillhead, and Maryhill Gas Company, and also of the Old Kilpatrick Gas Company, were acquired. In 1892, the Corporation bought the Pollokshaws Gas-Works; and in 1902, the gas-works in Milngavie were also purchased. The area now supplied by the Corporation extends to 98 square miles; and there are 1020 miles of mains. The progress made by the undertaking will be better understood from the following table:—

| Year. | Gas Made. Cubic Feet. | Number of Consumers' Meters. | | Price per 1000 Cubic Feet. |
|---|---|---|---|---|
| | | Ordinary. | Prepayment. | |
| | | | | s. d. |
| 1827 | 79,235,000 | .. | .. | 10 0 |
| 1837 | 162,606,000 | .. | .. | 9 0 |
| 1847 | 391,353,000 | .. | .. | 5 0 |
| 1860 | 769,241,000 | .. | .. | 5 0 |
| 1870 | 1,295,863,000 | .. | .. | 4 7 |
| 1880 | 1,859,582,000 | 131,910 | .. | 3 10 |
| 1890 | 3,059,277,000 | 134,215 | .. | 2 6 |
| 1900 | 5,969,111,000 | 201,878 | .. | 2 2 |
| 1910 | 6,977,904 000 | 223,889 | 49,957 | Lighting, 2s. Prepayment, 2s 7d. Power and manufacturing, 1s. 8d. |

## Provan Gas and Chemical Works.

The Provan Gas and Chemical Works were opened in 1904, and, being the most recently erected, are well equipped in every way. Sufficient ground has been bought to accommodate plant capable of manufacturing from 40 to 50 million cubic feet of gas per day; but at present only one section has been erected, which has been producing fully 12 million cubic feet daily during last winter.

The two retort-houses each contain 720 retorts, 9 feet long, ⏢ shaped, 23 in. by 16 in., built in settings of twelves. The heating throughout is done by fuel gas obtained from 24 large producers placed outside the retort-houses—the gas being conducted to the setting through steel mains lined with fire-brick. The percentage of fuel used in these producers is practically the same as is employed in the ordinary internal producers in the other works. While no saving in this respect is claimed, the lower labour costs and the regularity of the temperature obtained in the retort-settings make the system a desirable one. In addition to the better carbonizing returns secured, one result of this regular heating is shown in the longer working life of the retorts. Benches will be seen in action which were set in 1904. They have been in actual work for 1243, 1471, 1654, and 2059 days respectively. This means a much longer working life than we can obtain in our other stations where the internal producers are in use.

The charging and drawing of the retorts are carried out at all our works by the well-known Arrol-Foulis machines, worked by hydraulic power.

Conveyors for hot coke have never been in favour in Glasgow. At present, the coke is taken from the retorts in waggons drawn by small locomotives running on 30-inch gauge railways; the necessary quantity being taken direct to the producers, and the remainder run through the quenching-houses, and when cooled deposited in the hoppers of the gravity bucket conveyors, which deliver it either into stock or to the screening machinery.

Lime purification is employed at Provan as well as in our other works; some hesitation being felt as to the wisdom of sending out gas with a higher percentage of sulphur compounds than has been the custom for many years. Probably a combination of oxide and lime will be adopted in the near future. Our works in Glasgow have been favourably situated for lime purification; the best Irish limestone being delivered at a low rate and calcined in kilns erected in each of the works. There has also been little difficulty in disposing of the spent material to the farmers in the surrounding districts. A small percentage of air is mixed with the gas, as this has been found to give an increased working life of from 15 to 25 per cent. to the boxes.

The cyanogen is extracted from the gas at Provan and Dawsholm; the resultant liquor from the scrubbers being evaporated down to a cake containing on the average—

| — | Per Cent. | |
|---|---|---|
| | Soluble. | Insoluble. |
| Cyanogen | 14·04 | 4·68 |
| Equal to ferrocyanide of sodium (dry) | 27·36 | 9·12 |
| ,, ,, ,, ,, ,, ($10H_2O$) | 43·56 | 14·52 |
| ,, ,, ,, ,, ,, ($12H_2O$) | 46·80 | 15·60 |
| Carbonate of soda | 6·62 | .. |
| Water | 36·52 | .. |

This cake is sold under contract; the price being arranged according to the value shown by the analysis of a sample from each consignment, as carried out by an independent chemist.

A chemical works is provided by the Corporation in connection with each of the gas-works, for dealing with the liquid products. These chemical works are handed over to contractors for a stated number of years—a yearly rent being paid for the use of the works, and a price per ton on all the coals carbonized. This price is fixed month by month by an arbitrator, according to the scale arranged and the market prices ruling for the various products.

### SCALE.

The initial rate of per ton of coal carbonized is based upon the assumption that the market price of—

(1) Sulphate of ammonia is £12 per ton
(2) Pitch ,, £1 ,,
(3) Pitch oil ,, 1½d. per gallon
(4) Naphtha 30 per cent. ,, 6d. ,,

} Naked at the maker's works.

But the said initial rate to be from time to time subject to the following sliding-scale: If during any month from and after the commencement of the formal agreement to be entered into between the Corporation and the offerer, the average market price for that month of—

(*a*) Sulphate of ammonia is 20s. per ton more or less than £12 per ton, the foresaid initial rate shall rise or fall 2·84d. per ton of coal carbonized.

(*b*) Pitch is 1s. per ton more or less than £1 per ton, the foresaid initial rate shall rise or fall 0·60d. per ton of coal carbonized.

(*c*) Pitch oil is ¼d. per gallon more or less than 1½d. per gallon, the foresaid initial rate shall rise or fall 0·8775d. per ton of coal carbonized.

(*d*) Naphtha 30 per cent. is ¼d. per gallon more or less than 6d. per gallon, the foresaid initial rate shall rise or fall 0·25d. per ton of coal carbonized.

} Naked at the maker's works.

And a rise or fall to the extent of any fractional part of these prices shall also regulate the foresaid initial rate proportionally.

This system has been in vogue for a considerable time, and has been found to work smoothly. It also enables the Corporation to obtain better competition among chemical manufacturers for the contracts. The possession of the chemical works in close proximity to each gas-works saves carriage on the raw products, and places all offerers for the contracts on equal terms.

The great advantage of having a good area of surplus ground in connection with a gas-works is evident at Provan. The labour costs and wear and tear accounts are considerably less than at our congested works. There is also more freedom from worry; and the whole business of the station is carried on with more comfort, both to the workmen and staff. There is, however, a slight drawback to the site of our Provan works—its high elevation in comparison with the levels of some of the districts to be supplied through the distributing mains. This drawback has been overcome by using two Parsons steam-turbine exhausters to force the gas down into the holders at the Dalmarnock station, to supply the low-lying districts referred to.

## Dawsholm Gas-Works.

The Dawsholm Gas-Works were first laid down in 1871, to produce 3 million cubic feet of gas per day; but since then they have been greatly extended, and a chemical works added. These gas-works are now equal to a production of 18 million cubic feet per day; but the daily output up to the present time has only reached 14 million cubic feet.

## Temple Works.

Adjoining Dawsholm, and now connected to it, is the Temple Works, which, until recently, were mainly used for manufacturing the oil gas for enrichment. But since the candle power has been reduced, the plant has not been required. These works are convenient for experimental

purposes, and for some time have been in use in connection with the experiments on vertical retorts.

### Tradeston Gas-Works.

The Tradeston Gas-Works were originally built in 1835-8; but they were entirely rebuilt and greatly extended in 1888, and are now capable of producing 10 million cubic feet of gas per day. Tar and ammonia works have also been provided in close proximity to the gas-works.

### Dalmarnock Gas-Works.

The Dalmarnock Gas-Works were built in 1844. The plant, which is somewhat out of date, is capable of producing 7 million cubic feet of gas per day, but, with the exception of the gasholders and district governors, which are worked in conjunction with the station at Provan, is not used at the present time.

The small gas-works at Milngavie and Old Kilpatrick are only used for storage purposes.

### Meter-Testing and Repair Shops.

The Corporation also possess, in connection with the Distribution Department, large workshops for repairing and testing meters, and for cleaning and repairing cookers and grillers. These shops are located at Walls Street, in the centre of the city, and are well equipped with modern appliances. In all, 32,821 meters and 15,753 cookers, grillers, &c., were repaired during the last financial year.

In connection with the repair of meters, a system was adopted some years ago of bringing in all meters over a certain number of years' service. Those over 25 years were first dealt with; then those over 20 years; and all over 15 years are now being brought in for repairs and testing—the intention being to allow meters no more than 10 to 12 years' service without testing.

### Show-Rooms.

In addition to various small shops in the outside districts, a commodious show-room, fully stocked with gas appliances, was opened last year, and has proved of great advantage, both to the public and the department. Being situated in Sauchiehall Street—one of the principal shopping centres of the city—it is convenient for ladies; and as the premises are well lighted, and have large windows suitable for displaying the various gas appliances, a considerable amount of business has been secured, and a splendid advertisement obtained.

## GAS ACTS.

Until last year, the powers under which the Corporation administered the gas undertaking were contained in twenty separate Acts and Orders, in addition to the General Acts. As it was sometimes difficult to define exactly the powers of the department (not always a disadvantage), and as these powers were considered in many ways to be too narrow and detrimental both to the consumers and the undertaking, the Corporation in 1910 promoted a Bill to consolidate their Acts, and also to obtain an extension of their powers.

In the proceedings before the Parliamentary Committees, a good deal of opposition was met from the burgh and county authorities adjoining the city—their object being generally to prevent the promoters obtaining any alteration in the conditions ruling at the time, even when the powers asked were shown to be for the benefit of the consumers. As some of these authorities possessed electricity undertakings working in competition with the Corporation Gas Department, their opposition can perhaps be understood, and even excused. The opposition was fairly successful when the Bill was before the Committee of the Lower House; but many of the decisions given there were reversed when the Bill reached the Committee of the House of Lords. As eventually passed, it was, on the whole, satisfactory to the Corporation.

Among the clauses which were in dispute, the following may be noted.

### Powers to Charge.

Under the old Acts, the Corporation were bound to charge a flat-rate for all gas supplied both for street and ordinary lighting; and though they had made a differential rate for power purposes, there was a doubt as to the legality of doing so. The Corporation naturally desired more freedom to carry on their business, and, indeed, only wished to be put upon the same terms as the Electricity Department and the companies working in competition with them. These competitors were allowed to charge differential rates, and also to give special concessions to large consumers; and these powers were used to the full. By their aid, they had been able to induce many of the customers of the Gas Department either to give up or to reduce the use of gas and adopt other methods for lighting and power. A considerable amount of time was spent in dealing with this clause; and though the Corporation were refused relief in the first instance, they eventually obtained the usual clause enabling them to make differential rates, and also to give special terms and discounts. These powers will much assist the department to meet competition, and will enable them to encourage and obtain fresh outlets for gas.

### Sinking and Depreciation Funds.

Considerable opposition was offered to the methods and extent of the writing-down of capital adopted by the Corporation. Various rates, ranging from 1 per cent. with accumulations to 3 per cent. without, were fixed by the different Acts of Parliament as the percentages to be paid to the account of the sinking fund. The authorities who had charge of this matter were quite pleased with statements put before them, showing the amount of indebtedness of the department in comparison with the tonnage of coal carbonized per annum. An average rate of 2½ per cent. on the capital shown at the date of the Bill was mutually arranged; this rate also to be applicable to future borrowings, as far as presently authorized. With regard to the allowance set aside in the name of depreciation, the opponents of the Bill maintained that far too much had been done in this direction. They tried to make out that the consumers in the outside districts were being unfairly taxed to provide gas-works free of cost to the citizens of Glasgow, and that ultimately Glasgow would possess a most valuable property in the gas undertaking without having expended any money of their own for its provision.

### The Question of Depreciation.

A good deal has been written recently regarding the provision or otherwise of a fund to be applied towards reducing the book-value of the various assets of a gas undertaking. From an accountant's standpoint, the question has many sides; and no doubt the opinions expressed by correspondents and writers regarding this thorny subject may all contain a large proportion of truth, and each be fairly correct according to the point of view from which the subject has been approached.

There appears to be no settled rule regarding even the provision of a depreciation fund—far less the rates, &c., that should be allowed for it. It is being more recognized at the present time, however, that, while the present customers of a gas undertaking should not be asked to bear an undue proportion of the cost of providing the plant, &c., necessary to supply their demands, they should, at the same time, not be allowed to pay *only* the manufacturing and other present costs of the article, but should bear their fair share of the continuous deterioration of all the plant, buildings, &c.; and also the contingency of having to scrap parts of the plant to make room for improved methods of manufacture and the like.

Outside the purely actuarial view of this question, there is another that appeals directly to all those who have the direction or control of gas undertakings. With the strenuous competition which will without doubt appear in the future—if it has not yet arrived—the provision of ample depreciation and sinking funds is most desirable. They will enable gas undertakings who have had their capital well reduced by these funds to meet the competition on much better terms than others who have all along been using up their full amount of surplus revenue.

It has been fortunate that the members of the Corporation Committee of the gas undertaking have always considered it to be their duty to make due provision towards the depreciation of the works and plant. The rates were formerly calculated on the reduced capital; but in 1906, when a Special Sub-Committee were considering this question, the members thought the method was not correct, and decided it would be better financing to calculate on the book-value at that date, with the full additions to capital added every year—it being pointed out that, by the old method of calculating on a continually reducing amount, the book-value would practically never be wiped out. By the proposed method, the various items, according to the percentage allowed, would be written off in a definite number of years. The recommendation of the Sub-Committee was adopted,

and the rates were fixed; the charges for last year being as follows—

| | | | | |
|---|---|---|---|---|
| On Gas-works | at 1½ | per cent. = | £22,092 | 12 3 |
| ,, Chemical works | ,, 3 | ,, = | 2,880 | 19 7 |
| ,, Pipes | ,, 2 | ,, = | 10,471 | 19 9 |
| ,, Meters | ,, 6 | ,, = | 15,929 | 18 6 |
| ,, Stoves | ,, 10 | ,, = | 8,369 | 5 1 |
| ,, Premium | ,, 2½ | ,, = | 4,357 | 15 7 |
| | | | £64,102 | 10 9 |

By many, these rates will not be considered at all excessive—indeed, the provision for gas-works is low—the figure being fixed at a time when the valuation showed that the allowance made in earlier years had been somewhat generous. The Parliamentary Committee, after hearing all parties, took the unusual step of limiting the percentage amounts to be set aside for this account, and said that the rates in force at that time were not to be exceeded in future.

No doubt, at the present time, the capital of the undertaking is fairly low, in comparison with that of some other authorities, as shown by the following tables.

From the table, it will be noted that, in the case of the gas and chemical works, the fluctuations of capital are very marked. When the Companies' undertakings were acquired in 1869, the capital stood at £268 per million cubic feet sold. The extensive alterations and new works required to put the undertaking on a sound basis and provide for expansion, increased the capital in 1880 to £359 per million. During the next ten years, no important works were required, and full advantage of this period was taken to write-down the capital; so that in 1890 the book-value was reduced to the

*Gas and Chemical Works.*

| Year. | Gas Sold. | Gross Capital. Expended. | Gross Capital. Per Million Cubic Feet Sold. | Gross Capital. Per 1000 Cubic Feet Sold. | Capital. Less Depreciation and Property Realized. | Capital. Per Million Cubic Feet Sold. | Capital. Per 1000 Cubic Feet Sold. |
|---|---|---|---|---|---|---|---|
| | Cubic Feet. | £ s. d. | £ s. d. | s. d. | £ s. d. | £ s. d. | s. d. |
| 1869–70 . . | 1,010,117,000 | 270,587 19 7 | 267 17 5 | 5 4·29 | 252,359 6 0 | 249 16 7 | 4 11·96 |
| 1871–80 . . | Additions | 477,391 12 4 | | | | | |
| 1879–80 . . | 1,577,466,000 | 747,979 11 11 | 474 3 3 | 9 5·79 | 566,490 13 9 | 359 2 2 | 7 2·18 |
| 1881–90 . . | Additions | 166,719 3 4 | | | | | |
| 1889–90 . . | 2,752,989,000 | 914,698 15 3 | 332 5 1 | 6 7·74 | 349,233 16 4 | 126 17 1 | 2 6·44 |
| 1891–1900. . | Additions | 703,489 0 1 | | | | | |
| 1899–1900. . | 5,399,536,000 | 1,618,187 15 4 | 299 13 9 | 5 11·92 | 853,515 17 10 | 158 1 5 | 3 1·93 |
| 1901–1910. . | Additions | 883,276 6 6 | | | | | |
| 1909–1910. . | 6,374,950,000 | 2,501,464 1 10 | 392 7 9 | 7 10·17 | 1,476,274 10 8 | 231 11 5 | 4 7·57 |

*Pipes and Services.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1869–70 . . | 1,010,117,000 | 184,328 18 3 | 182 9 7 | 3 7·79 | 180,830 11 10 | 179 0 4 | 3 6·96 |
| 1871–80 . . | Additions | 141,219 8 10 | | | | | |
| 1879–80 . . | 1,577,466,000 | 325,548 7 1 | 206 7 5 | 4 1·52 | 288,582 6 10 | 182 18 10 | 3 7·90 |
| 1881–90 . . | Additions | 43,450 16 3 | | | | | |
| 1889–90 . . | 2,752,989,000 | 368,999 3 4 | 134 0 8 | 2 8·16 | 165,013 16 9 | 59 18 9 | 1 2·38 |
| 1891–1900. . | Additions | 246,236 16 11 | | | | | |
| 1899–1900. . | 5,399,536,000 | 615,236 0 3 | 113 18 10 | 2 3·34 | 326,251 18 5 | 60 8 5 | 1 2·50 |
| 1901–1910. . | Additions | 244,436 4 9 | | | | | |
| 1909–1910. . | 6,374,950,000 | 859,672 5 0 | 134 17 0 | 2 8·36 | 483,115 1 9 | 75 15 8 | 1 6·18 |

*Meters.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1869-70 . . | 1,010,117,000 | 104,874 7 6 | 103 16 5 | 2 0·91 | 99,127 9 10 | 98 2 8 | 1 11·55 |
| 1871-80 . . | Additions | 92,537 6 10 | | | | | |
| 1879-80 . . | 1,577,466,000 | 197,411 14 4 | 125 2 11 | 2 6·03 | 131,997 12 9 | 83 13 6 | 1 8·08 |
| 1881-90 . . | Additions | 45,744 12 9 | | | | | |
| 1889-90 . . | 2,752,989,000 | 243,156 7 1 | 88 6 6 | 1 9·19 | 108,359 15 6 | 39 7 2 | 9·44 |
| 1891-1900. . | Additions | 164,216 10 3 | | | | | |
| 1899-1900. . | 5,399,536,000 | 407,372 17 4 | 75 8 11 | 1 6·10 | 180,839 3 2 | 33 9 10 | 8·03 |
| 1901-1910. . | Additions | 164,033 5 3 | | | | | |
| 1909-1910. . | 6,374,950,000 | 571,406 2 7 | 89 12 8 | 1 9·51 | 219,574 3 9 | 34 8 10 | 8·26 |

*Stoves.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1869–70 . . | .. | .. | .. | .. | .. | .. | .. |
| 1879–80 . . | .. | .. | .. | .. | .. | .. | .. |
| 1885–90 . . | .. | 27,046 4 8 | 9 16 5 | 2·35 | 14,524 12 6 | 5 5 6 | 1·26 |
| 1891–1900. . | Additions | 44,555 7 11 | .. | .. | .. | .. | .. |
| 1899–1900. . | 5,399,536,000 | 71,601 12 7 | 13 5 2 | 3·18 | 40,314 7 1 | 7 9 3 | 1·79 |
| 1901–1910. . | Additions | 115,769 10 9 | .. | .. | .. | .. | .. |
| 1909–1910. . | 6,374,950,000 | 187,371 3 4 | 29 7 10 | 7·05 | 66,593 9 6 | 10 8 11 | 2·50 |

*Gas and Chemical Works, Pipes and Services, Meters, and Stoves.*

| Year. | Gas Sold. | Gross Capital. Expended. | Gross Capital. Per Million Cubic Feet Sold. | Gross Capital. Per 1000 Cubic Feet Sold. | Capital. Less Depreciation and Property Realized. | Capital. Per Million Cubic Feet Sold. | Capital. Per 1000 Cubic Feet Sold. |
|---|---|---|---|---|---|---|---|
| | Cubic Feet. | £ s. d. | £ s. d. | s. d. | £ s. d. | £ s. d. | s. d. |
| 1869–70 . . | 1,010,117,000 | 559,791 5 4 | 554 3 5 | 11 0·99 | 532,317 7 8 | 526 19 7 | 10 6·47 |
| 1879–80 . . | 1,577,466,000 | 1,270,939 13 4 | 805 13 7 | 16 1·34 | 987,070 13 4 | 625 14 6 | 12 6·16 |
| 1889–90 . . | 2,752,989,000 | 1,553,900 10 4 | 564 8 8 | 11 3·44 | 637,132 1 1 | 231 8 6 | 4 7·52 |
| 1899–1900. . | 5,399,536,000 | 2,712,398 5 6 | 502 6 8 | 10 0·54 | 1,400,921 6 6 | 259 8 11 | 5 2·25 |
| 1909–1910. . | 6,374,950,000 | 4,119,913 12 9 | 646 5 3 | 12 11·09 | 2,245,557 5 8 | 352 4 10 | 7 0·51 |

low figure of £127 per million. From 1890 to 1900, a good deal of expenditure was incurred by important reconstruction work and the provision of mechanical stoking machinery, which increased the capital figures to £158 per million in 1900. From 1900 to 1907 the figure was further increased—mainly due to the construction of the large new works at Provan. But since 1907 to 1910 the depreciation fund has again begun to make its action felt; and the capital now stands at £231 per million cubic feet of gas sold.

In the capital account for mains and services, the figures have been more regular. The valuation of the mains and services in 1869 was equal to £182 per million cubic feet of gas sold. In 1880, this figure remained stationary; but owing to the rapid increase of output, and the action of the depreciation fund, it was reduced in 1890 to £60 per million, and in 1900 the value stood at almost the same figure. However, since 1900 a good deal of renewal and extension work has been undertaken; and in 1910 the figure was £76 per million.

The capital against meters has been on a regularly descending scale. But this account is likely to increase in future, due to the cost of installing prepayment meters and the small consumption obtained through them. At present, it stands at £34 per million.

The capital account against stoves only began in 1884, and has been on the ascending scale. This is due to the number of cookers, grillers, &c., on hire (52,700), and the number of small stoves and grills given out free with the prepayment meters (15,100). During the last four years, the increase has been very rapid; but the 10 per cent. allowance for depreciation ought to keep the account perfectly safe. Should, however, the Corporation decide to give out all cookers free of hire, the increase in this account would be very extensive.

The tables can be examined at your leisure; but a glance at the totals for the various years will show clearly the results of the writing-down policy of the Gas Committee. Although the figures may be considered fairly satisfactory at the present time, circumstances may arise when it would be advisable to increase the rates fixed by Parliament; but whatever the necessity, the required provision could not be made until fresh powers were obtained.

### Surplus Profits.

Over the clause giving power to take surplus profits in aid of the rates, there was a keen fight. In the old Acts of Parliament, Glasgow had similar powers to those possessed by most English corporations owning gas undertakings. But, unlike these corporations, the powers, with the exception of a few trifling sums for very special purposes, had never been exercised. Seeing the consumers had been dealt with so fairly during the forty years the Corporation had managed the gas undertaking, the Corporation desired to have the clause continued in their new Act. At the same time, it was recognized that if it was bad policy to take the profits from the Gas Department in aid of the rates in the old days, when gas suppliers had a practical monopoly of all lighting and heating business, and when nearly every ratepayer was a gas consumer, it would be doubly wrong to take profits now when gas has so many competitors, and use the money obtained from gas consumers to assist in paying the rates of customers of a competing undertaking. This system of unsound finance, when carried to excess, is, no doubt, undermining the stability of not a few municipal gas undertakings. Perhaps the loss and unsoundness may not have been very heavily felt up to the present; but in the future, when more active competition is met with, the dead-weight of heavy capital and high prices will materially lessen the fighting power of the rate-aiding gas authorities.

It was also well known that Parliamentary Committees, in connection with Bills promoted by some of these local authorities, had shown in no uncertain manner that they were not in sympathy with proposals giving the promoters powers to apply large sums in aid of rates. The Corporation—or, I should rather say, the members of the Gas Committee—were, therefore, not greatly disappointed or displeased when the Committee of the House of Commons decided not to renew the surplus clause. The Gas Committee felt that future councillors would now be compelled to carry on the present methods of finance so far as surplus profits were concerned; the temptation to do otherwise having been removed. Needless to say, the Gas Engineer did not feel at all hurt by the decision come to to strike out the clause.

### Municipal and Company Owned Undertakings.

When considering the policy and business of a municipal gas undertaking, there is occasional necessity for making comparisons with company-owned concerns, and weighing up all the *pros* and *cons*, to see if the advantages and troubles are equally shared.

Unless where large sums are allocated from profits towards the relief of rates, it appears that the payments on account of capital are usually rather less in the municipal undertaking, though in some cases the payments towards interest, sinking fund, and depreciation often bulk nearly as large as dividends. Then a local authority are not usually subject to so many restrictions and tests as a company; and they can generally obtain new or extended powers with less opposition. In the use of streets and roads, more liberty also is allowed; and by arrangement with other departments, repairs to roadways, &c., can often be carried out on more economical lines. In connection with street lighting, companies have generally to face more onerous conditions—more especially where a municipally-owned electricity undertaking is a competitor. In the matter of rates, most authorities impose on companies to the uttermost fraction all the rates that can be levied, while their own concerns are not so hardly dealt with. All these items, and many others that might be named, are tangible advantages, and should have some effect in lowering the working costs of the municipal undertaking.

There are, however, on the other side, many points which claim attention. Companies carry on business in all their various details as purely commercial concerns. They are able to buy and sell in the most favourable markets and to the best advantage; and, being recognized as traders, they can carry on all kinds of work in connection with their business without opposition or hindrance. Then they have a free hand to push, in all legitimate ways, the hire and sale of all gas appliances, and do everything possible to encourage the output and uses of gas. They have also entire freedom in connection with the employment and control of their staff and workpeople, and can treat all their employees in a liberal spirit, and even arrange a profit-sharing scheme for them, well knowing they can demand and obtain an equally liberal service in return.

With a board of directors in charge of an undertaking, there is also a continuity and method in policy and management, as all these gentlemen hold office for long terms; and self-interest, if no higher cause, compels them to learn all the details of the business. The experience gained during many years of office enables them to weigh carefully every proposal and matter that may be submitted for their consideration. A corporation or local authority, on the other hand, are subject to, and influenced by, so many interests that they have not the same freedom in the conduct of their affairs.

Nearly all their contracts have to be made by tender, and no bargaining is possible. A gas committee, therefore, is not able to buy or sell to the same advantage; and traders, knowing this weakness, by a quiet arrangement among themselves, are often able to obtain better terms than those ruling in the open market. Then there are so many other departments and traders all well represented on the council and committees that those supposed to be directing the management of the gas undertaking are not able to unite together and act entirely for the benefit of the department and the gas consumers.

The question of the employees is a very serious one in connection with municipal undertakings. This is especially the case in large cities where there are many corporation departments. When combined for their own interests, they are able at election times to exercise considerable pressure on candidates for municipal honours; and the after-effect of this pressure is often apparent. Where these conditions prevail, though good wages are, and should be, paid, it is difficult to obtain the same value in work or interest that can be secured by a company.

The *personnel* of committees is continually changing; and while new members often bring enthusiasm to bear on the work, it is difficult to find representatives who are able to give the time necessary to obtain the large and varied experience required to put them on a par with directors of companies.

These are a few of the points that have been impressed on me during the many years I have served under both corporation and company control. Taking all things into consideration, there appears to be no doubt that gas companies

possess the greater powers and qualifications for making their undertakings successful.

### VERTICAL RETORTS.

In approaching the subject of carbonizing, it may be remarked that some of us can still look back on the days when, in many works, the heating of the retorts and the methods of working appeared to offer little scope for new ideas. Very often the settings were built under the supervision of an old experienced bricklayer, who carried all the details of construction in his memory, and who usually found out, by a process of trial, the arrangement of flues and furnace that gave the best heating results. Experimenting seldom went beyond varying the number and the position of retorts in a setting, or building the side walls of the furnace in such a way that renewals could be carried out with extra dispatch. The handy-man who attended to the patching of the retorts usually had charge of the dampers; and if after repeated alterations he was unable to obtain sufficient heat in the retorts to please the carbonizing foreman, the almost invariable excuse made was that the back flues had got choked, and the drastic remedy of a pail of water thrown into the furnace was as often as not resorted to. The decision as to which method of charging should be adopted caused little anxiety; for the choice lay between the two alternatives of the scoop and the shovel—the scoop being usually favoured in the southern, and the shovel in the northern parts of the kingdom.

Compared with these times, immense improvements are now apparent in all sections of carbonizing work. The advent of gaseous firing was the main factor in disturbing the state of quiet monotony; and its success after much experimenting and discussion, caused engineers to look round their retort-houses and see if there were not other details that could be improved. Difficulties with the workmen then began to crop up; and this trouble gave the opportunity for the introduction of machinery to take up the heavy work of charging and drawing the retorts. As a necessary corollary to machine charging, elevating, and conveying machinery made their appearance; and in many works, with the aid of these and other new appliances, the raw material passed from the coal-truck to the coke-waggon practically without the aid of hand labour. Although these improved methods of working reduced the number of retort-house men, they increased the number of mechanics; and while in most works they reduced the labour cost very materially, in some cases the increase in the wear and tear account very nearly counterbalanced any saving made in the retort-house labour charges.

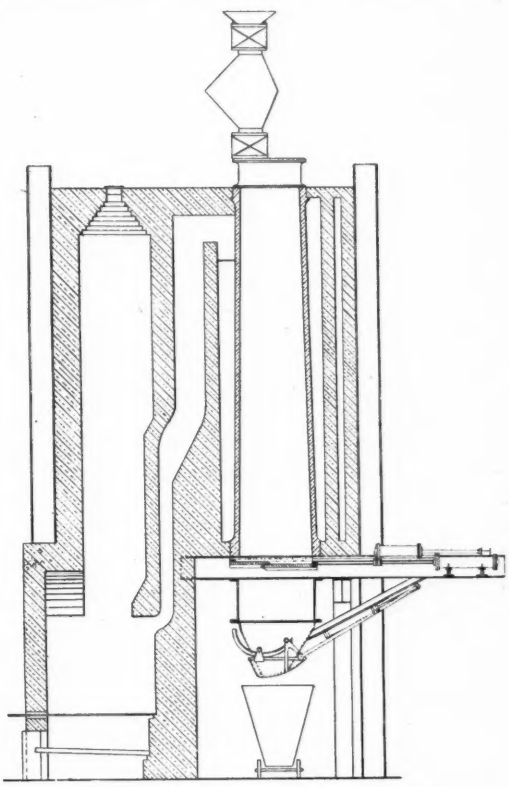
Improvements in methods of heating and working continued to be made for many years, and generally repaid those who adopted them by giving better returns from the coal carbonized, in addition to the reduced labour charges. Inclined retorts were introduced; and though there was considerable initial trouble, the work of experimenting with them, and the many discussions that ensued, had the effect of widening the general knowledge of carbonizing routine. In the eyes of their supporters, they bid fair to sweep the horizontal retort out of the field. The advent of the machine for pushing out the coke from the retort gave to the horizontals a new lease of life, and, by allowing full charges to be adopted, with all the corresponding benefits of high carbonizing results and low labour costs, placed this system again in the forefront.

While this rivalry between the horizontals and inclines continued, a third competitor came on the scene—viz., the vertical retort system. It may be said to have been new as regards gas-works practice, though it had been in constant and successful use in the shale-oil industry in Scotland for many years, and had been tried in various places for gas-making purposes. How far verticals have travelled on the road of progress towards the ideal which, no doubt, most of us have in our mind's eye, will be set forth in the various papers which are to be presented to the Institution at this meeting.

Like most engineers, your President watched with much interest the various modifications of the systems which were being brought out, and looked carefully into the question as to whether any of them would suit the circumstances of the Glasgow Corporation, as we were prevented from adopting pushing-out machines by the class of coal used, and so were debarred from all the advantages of full charges. A deputation of the Gas Committee inspected various installations, and were much delighted with what they saw, and, might I also add, with the very kind and hospitable manner in which they were received.

Both the intermittent and continuous systems presented many advantages; but with the hard non-caking Scotch coal used in Glasgow, it was thought that neither system seemed to meet all our requirements. It was, therefore, decided to design and erect a trial setting of four retorts to be worked on a "continuous-intermittent" system—that is, continuous so far as the production of gas is concerned, and intermittent as regards drawing and charging—to try and meet our local conditions. In the setting as erected, the fire-clay retorts are each 20 feet long, 3 ft. 4 in. by 10 in. at the top, and taper out to 4 ft. by 18 in. at the bottom. In a new installation the lengths will be 23 feet.

At first there was a shot-pouch arrangement on the top of each retort for charging purposes, and a cast-iron measuring chamber underneath the retort, with a door at the bottom for the withdrawal of the coke. At the top of each coke-measuring chamber, two sliding plates, actuated by hydraulic power, cut off the measured quantity of coke, and retained the charge in the retort while the measured quantity was withdrawn. As soon as the coke was withdrawn and the bottom door shut, the slides were drawn back, allowing the charge in the retort to fall and fill the measuring chamber,

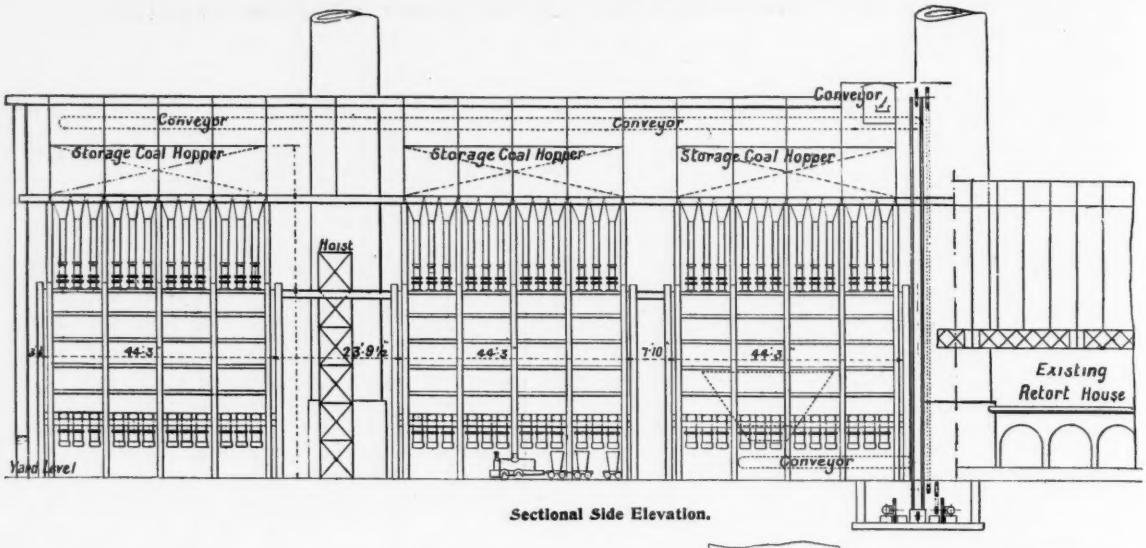


**The First Glasgow Vertical Retort Arrangement.**

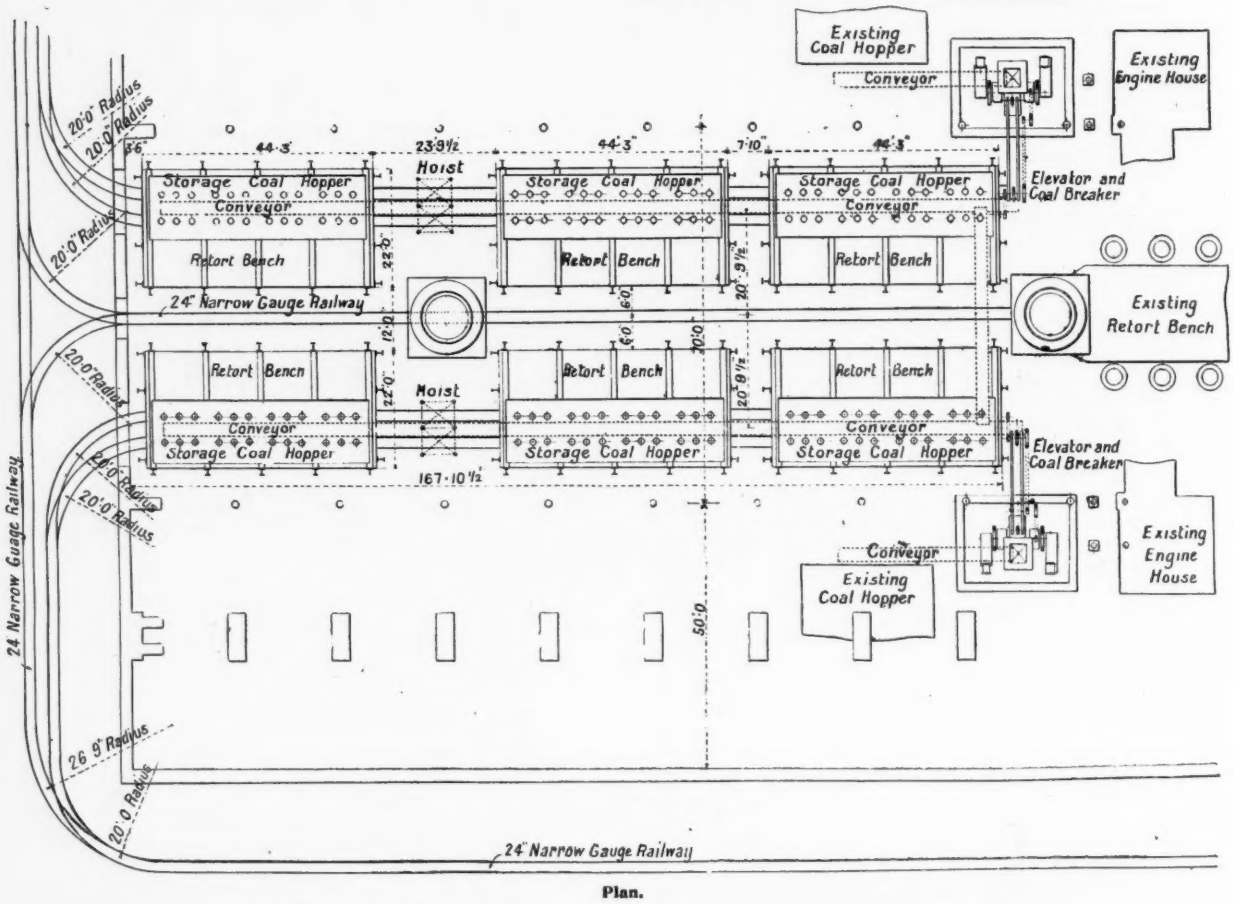
and, of course, leaving an empty space at the top portion of the retort. This empty space was then filled up by allowing the necessary quantity of coal to drop into the retort. Each retort was operated in this manner every four hours.

The setting gave quite encouraging results from the commencement. But, of course, in practical working, it soon became evident that improvements could be effected. The shot-pouch arrangement was first discarded, as it was found that the flat slide-valves in use were not satisfactory. A simple plug-cock with the openings at right angles was adopted, and has since been found to work well. The next step was to discard the slides above the coke chamber, as these were found to be costly and unnecessary; the quantity of coke to be discharged being quite easily measured in a properly constructed barrow, shoot, or bogie, placed underneath the coke-chamber.

A hydraulic pushing arrangement was also provided on the top of each retort, so that, in the event of any charges hanging up, they could be forced down without delay, or extra labour to the men. With one or two coals, this arrangement appeared to be necessary; but these pushers will not be provided in future—the difficulty of hanging charges having been got over by building the retorts parallel




Sectional Side Elevation.




Plan.

for fully half their height, and giving all the taper to the top part of the retort where the trouble occurred.

Both brick-built and moulded retorts have been tried; and our experience, like the long and extensive experience of those in the shale-oil industry, points to the superiority of the brick-built retorts. In our new installation, these will be adopted.

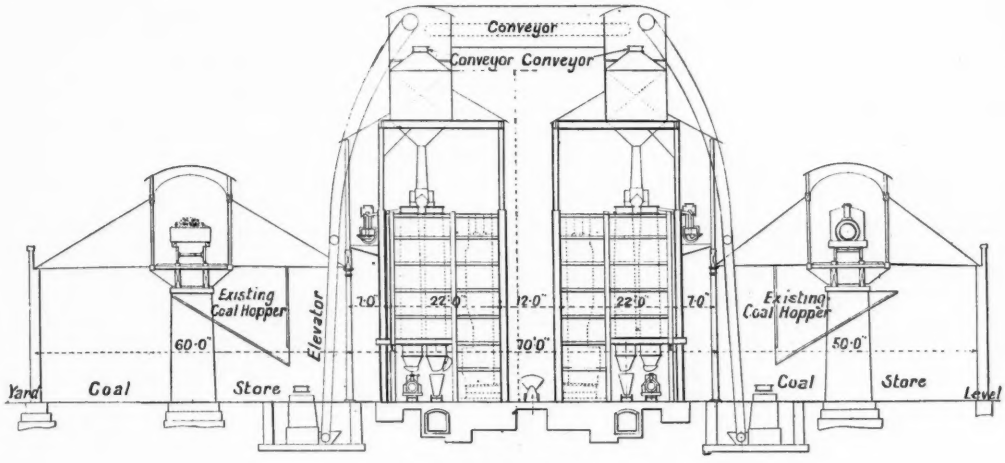
The heating arrangements are made as simple as possible. The producer being carried to the top of the setting, sufficient store of coke can be put in during the morning shifts to provide the fuel required during the twenty-four hours; and as the cleaning of the producers and all coal breaking and elevating will also be performed during the morning shift, only the men required for the actual drawing and charging and dealing with the coke will be in attendance during the afternoon and night shifts.

The fuel gas and secondary air are admitted between each of the top sections of the retorts, in parallel streams, so that little mixing takes place in the top section. The mixing of the gas and air with the consequent combustion take place in the second section where the heat is required—the temperatures getting gradually reduced in the downward travel of the gases. The flues are all of ample proportions; and the rate of flow of the gases is kept as slow as possible.

No doubt, with more experience, further improvements may suggest themselves; but the results obtained from the present setting have been considered sufficiently good to warrant the erection of a 4 to 5 million installation, on the site of a 2 million section of horizontals which were worn out and required complete renewal.

The present trial setting has been carbonizing from 3 to 3½ tons per retort per day. In comparison with the results obtained in the adjacent works at Dawsholm, where the same classes of coal are used, the coke made is larger in size, better in appearance, and is sold at a higher price; the tar contains about 15 per cent. less free carbon; the ammonia promises an increase of 6 to 8 per cent.; and the production of gas shows an increase of over 500 cubic feet per ton. The labour costs of a vertical installation will, without doubt, be much lower than horizontals with machinery; and the upkeep, from our experience, ought to be greatly reduced. The working conditions of the men in the retort-

## PROPOSED INSTALLATION OF VERTICAL RETORTS AT THE DAWSHOLM GAS-WORKS, GLASGOW.




**Sectional End Elevation.**

house will also be improved; and after the coal breaking and elevating has been done in the morning shift, the appearance of the retort-house will be, to an ordinary spectator, quiet and uninteresting.

As has been stated, each system has its own special advantages; and as further development takes places, each will probably be found to meet best certain local conditions. The local conditions in Glasgow required that a fairly high candle power should be produced when necessary, and also that the quality of the coke from the coal available should be improved if possible. The continuous process of gas making renders the first condition practicable; while the intermittent system of drawing and charging, with a period of rest for the charge of at least four hours, has fulfilled the second condition. In addition to these two main points, the endeavour has been to keep the process simple and avoid all continuous working gear in connection with the retorts, so that a low wear and tear account may be obtained.

### SOME OTHER TOPICS.

#### Visit of German Engineers.

Many of our members accepted the invitation so kindly given, and paid a visit to Brussels and enjoyed the company and hospitality of the members of the Belgian Gas Association; and since our meeting last year, the Institution have also had the honour and pleasure of welcoming to this country a large party of members of the German Association of Gas and Water Engineers. The history of the visit of our friends is duly chronicled in the "Transactions" of our Institution and in our journals; but I should like to take this opportunity of stating that I feel sure the visit was as much enjoyed by the hosts as by the visitors. From beginning to end, the arrangements fitted in like clockwork; and a great deal of work and pleasure was crowded into a short space of time. The visits to the various works so kindly thrown open for inspection, the hospitality so generously and gladly accorded, and the interest and help so freely tendered by all the Companies and Corporations concerned, showed that the invitation sent by our Past-President, Mr. J. W. Helps, was given in no half-hearted manner. On the other hand, the number of acceptances—although we hoped for more—the friendliness and good fellowship of our visitors, and the interest they took in all we had to show them, made the whole function an unqualified success.

Those of us who had the pleasure and profit of being in the company of our friends during the time of the visit, will not soon forget the experience and depth of knowledge of all gas matters possessed by the members of the German Association. Their keen conception of all the points connected with the various plants and processes of German and British gas manufacture, and the friendly way in which they criticized their own and our methods, showed that they were as anxious to excel and to do everything possible for the benefit of our industry, as any member of our own Institution. One could not help being struck with the advantage to all concerned of these opportunities of rubbing shoulders and having friendly intercourse with our *confrères* from across the water.

It might not be amiss to take this opportunity of impressing upon all gas directors and committees the great advantages that are sure to accrue to their several undertakings by sending their engineers and managers out into the world to learn, by actual experience, what other men are doing to solve the same problems that they are working at themselves. An engineer may be one of the most gifted men in his profession; but if he has to rely entirely on his own methods and experience, the wheels of his car of progress will be liable to get into ruts. These may, of course, lead in the right direction; but the journey to the desired goal will take longer, and be rougher and more full of obstacles, than if he had travelled in company, and on the road of wide experience levelled by the successes and the failures of other pioneers.

Reverting to the visit of our German friends, I am sure that we are all indebted to our Past-President, Mr. Helps, for the work that he did in connection with the visit, and especially to our Secretary, Mr. Dunn, for the splendid way in which he managed to fit in all the arrangements down to the smallest detail.

#### Standard Burner Bills.

The passing into law of the Standard Burner Bills Nos. 1, 2, and 3 has been one of the achievements of the year, and, in the opinion of Sir Henry Kimber, the Chairman of the House of Commons Committee, may form an important step towards some revision of the general legislation referring to gas undertakings. But his Committee appeared to be of opinion that the time had not yet arrived to insert a test for calorific power in place of the test for illuminating value.

The Bills had one object common to all—the adoption of the "Metropolitan" argand burner No. 2 as a standard burner, in substitution for the various burners in use for the statutory examination of the gas supplied by certain gas companies or undertakings; and all three Bills were linked together, but were considered separately. The promotion of a Joint Bill or Bills was for the purpose of bringing these companies into the line of modern practice as taken by the London Gas Companies and some eighty other gas vendors, and so furthering uniformity and a universal method of testing gas in all parts of the kingdom. The London Gas Referees prescribed the No. 2 "Metropolitan" burner for the Metropolitan Gas Companies, and the Board of Trade had also adopted this burner; for in all Provisional Orders that were granted by the Board of Trade during recent years the new burner was inserted. Again, the authorities of the House of Lords, in the Model Clauses which they issue yearly, had adopted the No. 2 burner as being better fitted for developing the truer value of the gas supplied.

It has time and again been argued that a reduction of price should follow the change of burner. But this should not be, when one considers that it was a disadvantage from which the vendors of gas ought never to have suffered, because Parliament clearly intended, as shown by the City of London Gas Act, 1868, and again stated in unmistakable language in the London Gas Act, 1905, that the burner to

be used for testing shall be the most suitable for obtaining from the gas consumed at 5 cubic feet per hour the greatest amount of light. The House of Commons Committee were unable to see that gas consumers ought to be compensated simply because a saving would follow the change of burner; nor were they disposed to entertain applications for compensation. Further, any improvements in the manufacture of the gas would tend to cheapen it, and so compensate the consumer automatically, whether supplied by a sliding-scale company or one paying the maximum dividend. Coatbridge, for instance, reduced the illuminating value of their gas from 20 to 14 candles without any modification whatever of the standard price.

Many petitions were lodged against these Standard Burner Bills; the object being to impose some further burdens on the suppliers of gas—the opponents believing it to be their duty to see that the consumers obtained good value for their money, when, as a matter of fact, they were standing in the way of modern improvements in manufacture and the like being attempted or adopted. Besides, gas vendors of to-day have no absolute monopoly of supply, and therefore have only the best interests of their customers to satisfy. Of the total number of statutory gas undertakings in the kingdom, about 75 per cent. still continue to have their gas tested with burners out-of-date and not consistent with modern requirements; so that there is much to be done ere the whole gas industry comes into line in respect of its measure for luminosity.

PUBLICITY COMMITTEE.

There are other subjects which well deserve our notice at this time; but we have a very long programme before us, and, no doubt, you are thinking I have already taken up too much of the short time at our disposal. Besides, many important questions will be dealt with in the very interesting papers that are to be placed before us and the discussions thereon.

I will, therefore, only ask you to give the proposals of the Publicity Committee your earnest consideration and your active assistance. The work proposed by the Committee ought to be well supported by every gas committee and gas company, because the benefits to be secured from its operations will be shared by all; and unless the members of the Committee receive cordial encouragement, they will not be able to attain the success that they—and I am sure we all—desire.

LEEDS UNIVERSITY.

I would also crave your support, as far as lies in your power, for the work that is being done in connection with the scientific side of our industry at the Leeds University. More money will be required there in the near future, to extend the facilities for research on the many important problems awaiting solution. Perhaps, more than money, personal interest is needed to obtain and maintain the right sort of young men at the University to carry forward this work, which is so essential to the future prosperity of our industry.

I will now close by wishing you all a very pleasant sojourn in this City of St. Mungo, and thanking you for the patient hearing you have given me.

## PERSONAL.

Alderman JOHN BICKERSTAFFE, of Blackpool, has been elected Chairman of the Fylde Water Board for the current year.

Mr. F. M. RUGGLES, Assistant to Mr. F. Paternoster, the Engineer and Manager of the Felixstowe Gas Company, has been appointed Assistant-Engineer to the St. John's Gas Company, Newfoundland. He is the youngest son of Mr. C. F. Ruggles, of Leighton Buzzard.

We learn that Herr GASTON KERN, who for about a quarter-of-a-century held the position of Manager of the Strasburg Gas-Works, has lately relinquished it to take an appointment under the German Continental Gas Company. Herr Kern, it may be remembered, was the author of an interesting account of the progress of gas supply in Strasburg during fifty years—a very handsome volume full of illustrations—which was noticed in the "JOURNAL" early last year.

Mr. FRED. CUTHBERT, who has received an engineering appointment with the Gaslight and Coke Company, served four years' articles with Messrs. Drysdale and Co., of Glasgow, engineers—three years in the fitting and erecting shops, and then in the drawing-office. He was afterwards two years in the drawing-office of the Barrowfield Iron-Works, Glasgow. Subsequently, he was with Messrs. Siemens Bros., of Stafford, as draughtsman. He was then over eighteen months as Engineering Assistant at the Perth Gas-Works. Over two years ago, he was selected as Assistant-Manager by the Kirkintilloch Town Council, and has had full charge, under the Manager, Mr. James Bell. Mr. Cuthbert's technical training was received at the Glasgow Technical College and University College, Dundee, of which colleges he holds a number of certificates in gas and mechanical engineering. He has been connected with the Scottish Junior (Western District) Gas Association since the beginning, has acted on the Council as Vice-President, and last March was elected President of the Association.

Before proceeding with the ordinary business at the Board meeting of the Romford Gas and Coke Company on the 3rd inst., a pleasing little function took place—namely, the presentation to the Chairman of the Company, Mr. JOSEPH SMITH, J.P., of a valuable set of decorative silver for the table, to mark the completion of fifty years' service to the Company in the capacity of Director and Chairman. The father of Mr. Joseph Smith was one of the founders of the Company; and the present Mr. Joseph Smith served the Company as Auditor before he was elected to the seat on the Board, which he has ably filled during such a long term of years. The presentation consisted of a handsome silver rose-bowl on ebonized plinth, four silver fruit stands, bonbon dishes, and spoons. The inscription engraved on the rose-bowl was as follows: "Presented to Joseph Smith, Esq., J.P., by the Romford Gas and Coke Company, Limited, in grateful appreciation of his valuable services as a Director of the Company for fifty years. Elected May 1, 1861; Jubilee, May 1, 1911." The presentation was made on behalf of the Board and shareholders by Mr. W. G. Wilshaw, one of the Directors, who has himself been associated with the Company for about forty years. Mr. Wilshaw said the donors asked Mr. Smith not to measure their appreciation of his services by the value of the gift. No offering they could make would extinguish the debt the Company owed him for the services of a lifetime; but it might serve to remind him, and perhaps his children after him, of the esteem and regard in which he was held by everyone connected with the Company. They offered him their sincere congratulations on his jubilee, and ventured to hope that he might be spared for a long time to come to inspire them with the spirit of energy which he had brought to bear upon all the public and private work in which he had engaged himself so well and so ably in the past. Mr. Smith thanked Mr. Wilshaw and his colleagues for their appreciation of the services he had been able to render to the Company.

To commemorate the completion of their twenty-five years of married life, Mr. and Mrs. J. H. HILL recently gave a tea to the officials of the York United Gas Company, of which Mr. Hill is Engineer, Manager, and Secretary. A programme of music, song, recitation, &c., was afterwards rendered by members of the staff; and during the evening a silver flower-stand was presented by the officials to Mr. and Mrs. Hill. In making the presentation, Mr. J. Britton remarked that the fact of having been spared to each other through the twenty-five years must be a cause of thankfulness to them; and he was sure he was voicing the wishes of everyone present when he said that he sincerely hoped Mr. and Mrs. Hill might be spared to celebrate their golden wedding. These sentiments were supported by Mr. H. Blain and Mr. T. P. Cooper. Mr. Hill, in accepting the gift, thanked the officials for this expression of their goodwill, accompanied as it was by hearty congratulations and good wishes to Mrs. Hill and himself. He then went on to point out some of the things that had taken place in the gas world since his advent into it forty-five years ago. In the offices of the York Gas Company, eight out of the nine officials had passed away—two of them, Mr. Sellars and Mr. Leaf, after over fifty years of service with the Company. The only survivor was his friend Mr. Britton, the cashier and head of the collection department, who last year completed his jubilee of service, and who he trusted would live long to carry out his duties as capably as ever. The staff was now thrice what it was in 1866; the number of consumers was quadrupled; and the quantity of gas sold was five times as great, though, owing to improved methods of gas making, the coal used in the year had only been multiplied by four. The price of gas then was 3s. 6d. per 1000 cubic feet, against the present charge of 2s. 2d. to 1s. 11d. At that time, gas for cooking and heating was scarcely used anywhere. Nowadays, almost every hotel, restaurant, and hospital in the land used gas cooking apparatus. The great majority of York gas consumers had now gas cookers, grillers, or boiling-burners. For heating purposes in winter time, gas-fires were rapidly making their way into shops, offices, consulting rooms, sitting-rooms, and bedrooms. There were about 3000 gas heating-stoves used in York every winter; and each season saw a large addition to their number, now that the Company made no charge for fixing, and let them out on hire at very small rentals. As to competition, in York the electricity undertaking commenced operations ten years ago, and had now about 1000 customers. In this period, the Gas Company had increased their consumers from 12,300 to 20,600, equal to 67 per cent., and the sales of gas had advanced 10 per cent.—being now well over 500 million cubic feet per annum.

# ELECTRICITY SUPPLY MEMORANDA.

**Public Lighting Contracts—High-Handed Procedure at Caversham—Ignoring Gas-Burner Progress—Is it Retaliation?—The Reading Electricity Company's "Bargain."**

THERE is before us a story, illustrating how a local authority can exercise their power to unfairly treat a concern with which business has been done for a great many years, which fact alone ought to have secured for it, unless there has been some real abuse of the business relations, better consideration than has been meted out to it. The parties, in this case, are the Reading Gas Company and the Caversham District Council. Not only, in our opinion, based upon the facts before us, has the Caversham Council dealt in a high-handed manner and most unfairly with the Gas Company, but, in view of the present circumstances, we do not think they have had due regard to the interests of the ratepayers of the district. In the first place, though the request for new terms for the public lighting of the district was only received by the Gas Company on Friday, March 24, the Company were asked to submit their prices not later than the following Monday. Conditions, prices required, the collection of the necessary information as to suitable lamps, and the calling of a meeting of the Board of Directors, were small matters to the District Council. But was it just that a demand of this kind should be hurled at the Gas Company, and only three days allowed for a response, with a Sunday intervening? We say that it was not; and certainly no member of the District Council who is a man of business, and has any decent consideration for fair play, can make any defence of such a hustling and unjust piece of procedure. There was no justification for it. Then we have it that the Council have accepted a tender from the Reading Electric Supply Company founded on a ten years' contract. There again is seen gross unfairness to the Gas Company. It is not the business of any local authority to have any consideration for, or to give any preference to, competitors for public work; it is not the concern of the local Council that one of the competitors is better equipped for service than the other. But if, with a view to making it possible for one competitor to submit a tender, it is necessary for that competitor that the contract should be for a term of ten years, then, in justice, the other competitor should also have the advantage of the similar condition, and should be asked to tender for a like period. This would be only equitable. The condition, however, was not offered to the Reading Gas Company; and therefore neither the Chairman of the Highways Committee (Mr. T. Norris) nor the Chairman of the Council (Mr. H. C. Dryland) can say that he has taken the fullest care to see that the absolute rock-bottom terms have been obtained from both undertakings for the ratepayers of Caversham. They have not held the scales fairly; and they have no knowledge whatever as to whether the Gas Company, with the more economical (in gas and mantles) and efficient inverted burners now at command, could supply them at a lower figure, and yet give a higher illuminating value, than hitherto.

It seems to us that there is something more at the back of this business than meets the eye; and we will suggest what it is. The action of the Council shows an undue haste, where undue haste was unnecessary. The Committee on whose report the tender for electric lighting has been adopted state that they have considered the question "most carefully." We deny that entirely. Until they had the Gas Company's terms before them, they could not consider the matter carefully in the interests of the ratepayers; nor do they yet know whether or not the Gas Company could have effected a saving in the rates as compared with the Electric Light Company. When the Gas Company were asked to tender, there was no pressing hurry, in view of the unexpired part of the gas contract now running; and the reply to the request for a tender, under conditions that were not on an equality with those accepted from the Electric Light Company, was tantamount to a suggestion, and a suggestion only, that the matter should be postponed. The good and ample reasons advanced for this were that, in view of the favourable results of the past year's working, the Gas Company had under consideration a revision of prices in the several districts supplied by them; and, further, that this revision could not be completed until the result was made known of pending questions affecting the boundaries and constitutions of such districts. This was a reasonable suggestion; and an altogether insufficient cause for the Council silently shutting and fastening the door against the Gas Company, proceeding with negotiations with the Electric Supply Company, and closing with the latter without acquainting the Gas Company of their intention to at once settle a contract.

It is manifest, however, that the answer of the Gas Company suited the book of the Council. If we mistake not, there is—it is regrettable, if true—a little animus against the Gas Company in the Caversham Council; and the Reading Electricity Company entertain no love for their competitors, and would unquestionably score-off them at any price. The Gas Company seem to have offended the District Council—and that gravely. There is a project for the incorporation of Caversham with Reading; and Caversham desires to continue independent existence. Throughout the steps taken for its absorption into the borough boundaries, the Caversham Council have been beaten in their hostility to the proposal; and there is now to be an appeal to the House of Lords. The unpardonable sin of the Gas Company is found in the fact that they gave the Corporation of Reading an excellent plank in their case by—it was only following precedent in the matter of a previous extension of the borough limits—sanctioning the inclusion in the Incorporation Bill of a clause providing that, on the annexation of Caversham, the prices for gas obtaining in the borough should apply to the extended area. So much the better, one would think, for the extended area. But there is the trouble—the Corporation were in a measure assisted by this concession on the part of the Gas Company. The contract with the Electric Supply Company looks, when all the circumstances are considered—when especially, after the Company's suggestion, there was no effort made by the Council to secure gas prices by giving proper time for tendering, and by intimating that the Council were not prepared to wait for the consideration of the revision of gas charges, or the determination of the question of incorporation—much like a piece of retaliation on the part of the Council, in which the Electric Light Company, we can quite imagine, would not be unwilling participators.

There is the point as to the ten years' contract with the Electric Supply Company entered into solely, for that length of time, in the interests of the Company. This is, next to the unjust treatment of the Gas Company, the most egregious feature of this piece of business, in view of the authority who have accepted the contract being on the brink of extinction, and their powers of administration passing over to the Reading Corporation. When a local body are approaching, or there is a prospect of them approaching, dissolution, there ought to be some power to prevent them binding their successors to a contract for such a long period as this one. We well know what happened with the St. George's (Hanover Square) Vestry. How that body, in their expiring hour, bound the Westminster City Council to a contract for electric lighting in the St. George's district at a price and under conditions that the Westminster City Council have since had bitter cause to regret. So have some of those who took part in making the contract. It was never imagined by them that gas lighting was going to develop in the remarkable manner that it has done. It was an irretrievable blunder. Alderman Everitt was Chairman of the St. George's Vestry in those days. He is a member of the Westminster City Council now; and when the latter entered into a big contract with the Gaslight and Coke Company last year for street lighting by inverted gas-burners, he said in the discussion that he was absolutely in favour of gas instead of electric lighting for the streets. "He was not always so, because electric lighting was introduced into the streets of St. George's on his casting vote as Chairman. Since then the Gas Company had awakened. If they had started to make improvements before, the streets of St. George's would never have been lighted by electricity. There was no comparison now between the two illuminants; gas was unquestionably the better and the cheaper."

In view of this pronouncement, the figures quoted to Caversham by the Reading Electric Light Company are of peculiar interest; and we say, without reserve, that they are not figures that can pay the Company, which shows that something other than profit is at the bottom of this contract. Their quotation must have come as a surprise to even the Chairman of the District Council (Mr. Dryland); for, when giving evidence before the Commons Committee recently, he stated that he did not know of any town selling gas at 2s. 6d. where the electric light company could compete with gas. In the tender that the Electric Supply Company have submitted, there is a little ambiguity that requires setting straight. In each section of the tender, so many "lanterns" are referred to, fitted with two "lamps;" and the quotation is given at per "lamp" per annum. Does the quotation mean per "lamp" or per "lantern?" If per "lamp," not per "lantern," then the total cost will work out to double the figure calculated, hereafter, by us. We have taken it that the figure quoted is per lantern. The first item is for 213 lanterns, each equipped with two 55-watt lamps to continue alight until eleven o'clock each night; the price being £1 17s. 3d. per lamp per annum. Now if we take the 1808 hours per annum that, according to the lighting table favoured by electricians, the lighting period represents, each pair of lamps would consume 199 units per annum (at 110 watts per hour), and dividing the £1 17s. 3d. by the 199 units, we have it that the revenue will equal 2·25d. only per unit, and that this includes alterations to, and equipment of, pillars and lanterns, supply of electrical energy, all necessary renewals of the lamps (averaging probably two renewals per lamp per annum) other than pillars and lanterns, also the lighting, extinguishing, and cleaning of the lamps Now will anybody be foolish enough to say that this is a paying price? It does not take into account the capital and ordinary distribution charges.

We have a worse example in the next item of the tender. Thirty-four lanterns, fitted with two 55-watt lamps, are to be kept running all night during the six winter months and till eleven o'clock from April 1 to Sept. 30. Consulting the table already referred to, the total number of hours of lighting for the lamps per annum will be 3353. Multiplying this by 110 watts per hour, we find a total consumption of 369 units. The charge for these lamps will be £2 3s. 6d. per lantern, which is equal to only 1·4d. per unit, including all the items previously mentioned. Is this 1·4d. a paying figure considering all it includes? Going on, we come to something still worse. There are four lanterns, each to be equipped with two 80-watt lamps, to run a corresponding time with the lamps last mentioned. These are to be charged at £2 13s. per lamp. The consumption per lantern will be equal to at least 200 watts per hour; and therefore, in the 3353 hours, 670 units will be consumed, which, at the price named, will represent just about 1d. per

unit, including all the charges previously mentioned. We go on to the last item—seven lanterns equipped with two 80-watt lamps to run all night the year through (that is, 4327 hours). These will consume about 865 units; and the charge is to be £3 2s. 6d. per annum, which is less than 0·9d. per unit. Let us repeat that this includes all necessary alterations and equipment of pillars and lanterns for electric lighting, the supply of electrical energy to the lamps, and all necessary renewals of the lamps, also lighting, extinguishing, and cleaning of the lamps. Are we wrong in assuming the prices refer to per "lantern" and not to per "lamp" in the lantern? If we are not wrong, then, on the face of it, and on the capital and working costs as revealed by the Electric Supply Company's accounts, it is not, in our opinion, a sound, business-like contract. The total revenue will amount to £503, assuming our surmise is correct as to per "lantern." There is not much revenue involved in the amount of the contract so far as the Gas Company are concerned; but there are matters surrounding the contract which are peculiar, and which, from our point of observation, are not altogether creditable, in view of what we have submitted in this article, to the Caversham District Council. In our judgment, as the matter stands, there has been a distinct dereliction of duty on their part, in not pursuing the matter further before finally settling the contract, and in not refusing, under existing circumstances, to bind the ratepayers and the possible successors of the Council to a contract comprehending a full decade.

## CORONATION ILLUMINATIONS.

London is garbing itself beyond recognition now, in view of the Coronation. At the Coronation of King Edward, the present generation had its first real taste of rejoicing on such an occasion. Good Queen Victoria, who had held a place in our affections so long, had occupied the Throne for such a span of years that there were few living who could remember the Coronation celebrations at the time she ascended the Throne. But with the Coronation of King Edward, all the circumstance of public rejoicing sprang into new life; and extensive and regal as were the finished projects then for giving expression to public rejoicing and goodwill, they have influenced the desire, on this occasion, to intensify the rejoicing by preparing for still more magnificent splendour.

Some streets of London are hardly known at the present time. They are almost encased in wood, offering points of 'vantage to the great multitude of lovers of spectacular effect, and to those whose loyalty to the Throne and Constitution will act as a magnet in drawing them to swell the human mass that will be brought together to witness the Royal procession on the day of the Coronation and the Royal progress through the main parts of the Metropolis on the day succeeding. Gas-fitters and electricians are busy piping and wiring the points of the more imposing buildings for the night illuminations; and while gas will have a good representation, electricity will have, for decorative purposes, a larger one, purely from the greater convenience it offers in lighting up and extinguishing where installations are on a large scale.

But decorative illuminations of the kind we have been dealing with are only temporary; the thing that really matters in street illumination is the standing or permanent lighting. While in Pall Mall, St. James's Street, Piccadilly, Regent Street, and club and theatre land generally, the people will be circulating in a dense stream to inspect the temporary gala dressings of the establishments flanking the footpaths, they will be doing so in safety by the light of high and low pressure gas-lamps, the possibility of any extinction of which is as remote as the possibility of extinction of the electric light is near. The County Council, the City Corporation, and the London Fire Brigade have shown their anxiety for the safety of the public and buildings, in connection with the Coronation decorations; and there exists some amount of fear, even in technical circles (though not publicly admitted), as to the overtaxing of circuit wires and cables. In the overloading there is danger, and the chances of collapse.

In the West-end of London and the City, the Gaslight and Coke Company have a large amount of work on hand, and local gas-fitters and contractors report themselves as busy. There are two things that commend the gas illumination device; and they are the economy of installation and the live effects of the devices and of the decorative work generally. We referred to the expression of opinion on this point of an expert only last week. If it were not for the labour involved in lighting up large schemes of decorative gas illuminations of the kind, electricity would stand a poor chance, though the expert in question thinks the effect produced by gas well worth the extra labour involved. But it is due to this, and to the inconvenience of the lighting up, that so many wealthy establishments have been induced to adopt electrical illuminations on this occasion. The electrical press are cockahoop over this; but they will find gas is far from being out ot the running, although electricity suppliers have been bound to offer the electricity for the illuminations at as low a price as 1d. and 1½d. per unit, possibly as some compensation for the terrible expense of electrical installation.

The following is a list of some of the principal places where Coronation illuminations will be supplied by gas by the Gaslight and Coke Company; and it shows that gas has not been left out in the cold in the West-end—to the extent that our electrical friends pretend or imagine it has been:

Clubs—

Grosvenor Club, Pimlico.
Ladies' Imperial Club, 17, Dover Street.
Arts Club, 40, Dover Street.
United University Club.
Athenæum Club.
Automobile Club.
Marlborough Club.
Guards' Club.
Naval and Military Club.
Junior United Service Club.
East India Club.
Wyndham Club.
Constitutional Club.
Union Club.

Hotels—

Carlton Hotel.
Hôtel Dieudonné, Ryder Street.
Métropole Hotel.

Societies—

The Royal Academy.
The Royal Geographical Society.

Embassies—

Russian Embassy.
Japanese Embassy.
Spanish Embassy.
Austro-Hungarian Embassy.

Traders—

Cadbury Pratt, 24, New Bond Street.
Scott, 1, Old Bond Street.
Purdey and Co., South Audley Street.
Goode and Co., 19, South Audley Street.
Gunter, Berkeley Square.
Kestrel and Co., 135, New Bond Street.
Mayer and Mortimer, 36, Conduit Street.
Stohwasser and Winter, 39, Conduit Street.
Collingwood, 46, Conduit Street.
Bailey, 116, Mount Street.
Allen, 117, Mount Street.
Scott, 39, Mount Street.
Lofts and Warner, 130, Mount Street.
Webster, 43, Dover Street.
Grunebaum, 48, Dover Street.
Hill, 3, Old Bond Street.
Cayley, 41, Old Bond Street.
London and Ryder, 17, New Bond Street.
Morris, 22, New Bond Street.
Callaghan, 23, New Bond Street.
Davis, 147, New Bond Street.
Cortier, 175, New Bond Street.
Hemming, 28, Conduit Street.
Elkington, Regent Street.
Fortnum and Mason, Limited, Piccadilly.

Railway Offices—

London and North-Western Railway Company, Parliament Street.
Great Northern Railway Company, Piccadilly Circus.
" " " " Victoria Street.
" " " " Oxford Street.
" " " " Tottenham Court Road.

Assurance Companies—

Norwich Union Life Insurance.
The Royal Insurance.
North British Insurance.
Mercantile Company.

Private Residences, Etc.—

Lord Lansdowne, Lansdowne House, Berkeley Square.
Lord Londonderry, 19, Park Lane.
Devonshire House, Piccadilly.
Duke of Wellington, Apsley House.
Lord Allendale, 144, Piccadilly.
Lord Illingdon, Park Place, St. James's.
College of Physicians, Pall Mall East.
Site of the Institution of Civil Engineers, Great George Street, Westminster.
Belgrave Mansions.
City of Westminster Town Hall.

Banks—

L.C.C. Bank, St. James's Square.
Barclay's Bank, Pall Mall.
London and South-Western Bank, 217, Strand.

Not only in the West-end of London, but in all other parts, gas will make a good show. Although there are no extensive illumination schemes in East and South London or the suburbs, the gas companies and local fitters are very busy with the devices of the smaller order for the tradespeople and the factories. Those are localities that one would hardly visit for the purpose of wandering through the streets for the admiration of illuminations. Though the illuminations in such areas are comparatively small, they represent the true spirit of the occasion, just as much as the larger display of the opulent West-end. In the West-end much of the wealth of illumination that will be seen on business establishments will be largely the result of competition—not in the expression of joy and loyalty, but in advertising. In the South of London, the Vauxhall Gas-Works will be illuminated, and the

several show-rooms of the South Metropolitan Gas Company will be gaily decorated with light. Among the more prominent installations that they are making for their customers are at—

The London and Joint Stock Bank, Borough.
The Mayor of Wandsworth's house at Clapham.
The Camberwell Town Hall.
The Lewisham Town Hall.
Messrs. Jones and Higgins, at Peckham.
Mr. W. J. Squires, at Woolwich.
The Railway Tavern, at Catford Bridge.
The Council Offices, Balham High Road.
The Library, Ramsden Road, Balham.
The Library, High Road, Streatham.
The Library, North Side, Clapham Common.

London Bridge it had been proposed to illuminate with gas and Blackfriars Bridge by electricity. But although the gas-fittings were largely in position, it was found more convenient to illuminate London Bridge than Blackfriars Bridge by electricity. It was therefore determined to change over; and so, as at present arranged, the latter bridge will be illuminated by gas instead of the former. Our dear old friend the "Electrical Review," which is easily agitated, has almost gone into ecstacies over the matter; and its only regret is that one of its representatives was not on the bridge with a camera to take a photograph of the simple work of unscrewing and removing the gas-pipes that had been erected. Poor "Review!" What little things give joy to some minds! And what horrible things, too, at times, such as when the Editors sit in their chairs and picture the writhings of the gas industry in the last ditch. In this London Bridge case, it is not an eviction, but a change over—for the convenience of whom?

Among the notable things that the Coronation procession has necessitated has been the removal of a number of centrally-placed lamp standards in the West-end for which electricians were originally responsible. The "Daily Telegraph" states that the Westminster City Council are lifting in Whitehall and elsewhere more than fifty street refuges and lamp-standards from the centre of the roadways, so that there shall be no obstruction to the Royal procession. The estimated cost of removing the refuges and lamp-standards is some £2600. Refuges are very useful in the streets of London at busy centres; but their frequency in some places is largely the result of a fad on the part of electricians; and not a small part of the £2600 is the price that is now to be paid for it when the centre portion of the roadway is wanted for a legitimate object.

## AUSTRO-HUNGARIAN GAS ASSOCIATION.

### Annual Meeting at Brunn.

The Thirtieth Annual General Meeting of the Association of Gas and Water Engineers of Austria-Hungary was held at Brünn on the 26th to the 28th of May. The following brief summary of the proceedings at the meeting is taken from the current issue of the "Zeitschrift" of the Association, in subsequent numbers of which the official shorthand writer's *précis* and reprints of the papers read will be given.

The President of the Association, Professor Ad. Friedrich, the Manager of the Vienna Corporation Gas-Works, was unfortunately prevented by urgent State business from being present at the meeting. The chair was taken, in his absence, by Herr Auzböck, the Chief Inspector in Vienna of the Imperial Continental Gas Association. There was a large attendance of members and guests at an inaugural reception held on the evening of the 25th ult., when a welcome was extended to the visitors by Town Councillor Lustig on behalf of the Local Committee.

The business of the meeting began on the morning of the 26th ult., when Herr Auzböck opened the session in a speech, in the course of which he expressed gratification at the presence there of a large number of distinguished visitors, including representatives of the Government Departments, Chambers of Commerce, &c. The annual report of the Association was then presented; and a paper was read by Herr A. Teodorowicz, the Manager of the Lemberg Gas-Works, on the use of charging and discharging machinery at his works. Herr Bernauer, of Budapest, discussed the paper. The next papers read were: On the "Water Supply of Vienna," by Herr A. Swetz; on "Vagrant Electric Currents," by Herr Th. Herrmann, of Gablonz; and on "Practical Results with Horizontal Carbonizing Chambers at Innsbruck," by Herr O. Peischer, the Manager of the Innsbruck Gas-Works. Then Baron von Graeve-Neuhof, of Osterode, read a paper on "The Divining Rod," and gave a demonstration of the use of iron and hazel rods for locating water, and of iron rods for locating gold. Herr Jonas, of Berlin, concluded the proceedings at the morning's session with a paper dealing with "Incandescent Gas Lighting."

The afternoon of the 26th was devoted to a visit to the Brünn Water-Works at Schreibwald, of which a descriptive account was given by the Manager, Herr Heinke. In the evening the members were the guests of the Corporation of Brünn at a performance in the Municipal theatre, and at a subsequent convivial gathering over which the Mayor and Mayoress presided.

The session on the morning of the 27th ult. opened with the transaction of the official and private business of the Association. The minutes of the previous year's meeting and the statement of accounts for the year, having been circulated in print, were taken as read. The election of officers was then proceeded with. There were chosen as President for the ensuing two years Dr. Franz Heltai, of Budapest, and as Vice-President (for one year) Dr. Hugo Strache, of Vienna. The remaining members of Council, the Auditors, and the Proceedings or Journal Committee were also chosen. Votes of thanks to the retiring President, Professor Ad. Friedrich and the retiring Vice-President, Herr Auzböck, were proposed by the Vice-President, who retains office for another year—viz., Herr Teodorowicz, Manager of the Lemberg Gas-Works. An invitation having been received by the Association from the town of Agram, it was decided to hold next year's meeting in that place. The following papers were then read and discussed: "The New Water-Works of Brünn," by Herr F. Abt, the Constructing Engineer; "Gas Propaganda," by Herr H. Güntner, of Vienna; "Low-Pressure High-Power Gas-Lamps," by Herr M. Scholz; "The Conversion of the Readings of the Lux Gas-Balance into Specific Gravities," by Herr F. Lux, of Ludwigshafen; and "Temperature Measurements in Retort-Settings," by Herr Rautenkranz, of Vienna. The business concluded with votes of thanks to the readers of papers.

In the afternoon the members were conducted in three groups over the Brünn Gas and Water Works, and the attached Refuse Destructor and Electricity Works. Refreshments were served in the vault beneath the raised tank of the new gasholder. Then Professor Hönig explained the treatment of the effluent of the Brünn sewage works, the sludge from which is utilized for the manufacture of illuminating gas. The banquet of the Association took place in the evening, and a lengthy toast-list was gone through. On the 28th ult., an excursion was made, in the course of which the constructional work now in progress for a new water supply to Brünn was inspected.

There was an interesting exhibition of gas plant and apparatus in a room adjoining that in which the sittings took place. A model lecture on, and demonstration of, cooking by gas was given in the course of the meeting by a lady lecturer from the Vienna municipal gas-works.

## "Field's Analysis" for 1910.

We have received from the compiler, Mr. George Orford, Assistant-Accountant to the Gaslight and Coke Company, a copy of "Field's Analysis," which has now reached its forty-second year of publication. Our readers are aware that the contents have been considerably extended during the past few years, and now include analyses of the accounts of the principal gas undertakings in the United Kingdom. Appended to the financial particulars are details of the coal carbonized, oil and spirit used, and gas made; the amount of capital employed per 1000 cubic feet of gas supplied on the days of maximum delivery; and the number of ordinary and prepayment consumers. It is interesting to note that the total number of consumers served by the three London Companies has risen from 1,029,468 to 1,145,660; those on the prepayment system being 736,542 on Dec. 30 last, compared with 645,549 at the close of 1909. The price of the work is 15s.

## Agitation among Milan Gas-Workers.

From Italian newspapers we learn that there is still unrest and dissatisfaction among the employees of the Union des Gaz Company's undertaking at Milan. It would appear that some dispute had arisen as to the hours to be worked by the boys assisting the gas-fitters, which resulted in the boys going out on strike. A mass meeting called of the general body of gas-workers was attended by about 400. They were addressed, among others, by Dr. Giovanni Allevi, who referred in general terms to the nature of the labour in gas-works from a health point of view, and by the Secretary of the Gas-Workers' Union, Sig. Filippo Corridoni. The failure of the last strike was attributed to the interference of political influences, and the Manager at Milan, Sig. Grüss, was made the butt for many of the observations offered. "We do not know," said Sig. Corridoni, "whether the hour of struggle will be to-morrow, in a month, in a year. The body of gas-workers is ready; it is at the vigil of a struggle; the whole body of organized workers ought in turn to be ready to help the gas-workers." A resolution was unanimously passed by the meeting, attributing the unrest to an alleged attempted new "organico" sought to be imposed, so it was said, on the men by the Union des Gaz Company, and promising both material and moral support to the gas-workers when needed. We understand that, in connection with the above, a representative of the Union des Gaz Company left London for Milan last week.

**Rendering Coal-Tar Hydrocarbons Soluble in Water.**—MM. Simon and Dürkheim have taken out a patent for France for a process for rendering coal-tar hydrocarbons soluble in water. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," hydrocarbons such as the xylenes, pseudocumene, &c., are rendered soluble by heating them with a suitable soap, using as little water as possible. For example, 40 kilos. of oleic acid, 40 kilos. of potash lye (20° Beaumé), and 20 kilos. of *o*-xylene are heated together, with agitation, until a homogeneous mixture is produced. This will be completely soluble in water, giving a clear solution containing up to 10 per cent. of xylene. The products are also soluble in sea water, and may be used for washing and other purposes.

# VICTORIAN GAS MANAGERS' ASSOCIATION.

### Papers and Discussions at the Fifth Annual Meeting.

In the report of the general proceedings at the fifth annual meeting of the Victorian Association which appeared in the "JOURNAL" for the 28th of March (p. 914), it was mentioned that the two papers read on the occasion had not come to hand, They, however, arrived by last week's mail, accompanied by a letter from the Hon. Secretary of the Association (Mr. Charles W. Howlett, of Melbourne) expressing regret at the papers—by inadvertence of some of his people—not having been posted with the other matter. We are now in a position to complete our report by giving the two papers and the discussions upon them.

Mr. J. A. AMBROSE (Heidelberg) read the first paper, which was on

## PROGRESS AND DEVELOPMENT OF A MUNICIPAL GAS-WORKS.

About the year 1888, a private Company was formed for the purpose of supplying gas to Heidelberg; and it carried on business, with more or less success, until the year 1896, when the works had to be shut down. The Company, being desirous of disposing of the concern, approached the Heidelberg Council; and after much deliberation, the Council decided to purchase, and took the works over in April, 1899.

I was appointed Manager in August of the same year. The plant was overhauled, put into working order, and two months later gas was again supplied. Altogether, four districts are supplied—viz., Heidelberg, Ivanhoe, Alphington, and Fairfield—the farthest point of supply being five-and-a-half miles distant from the works. The area reticulated may be described as a long and narrow one; and until a few years ago there was a considerable length of main between each township from which no supply was taken. Latterly, however, owing to the large number of houses being erected, these gaps are being gradually lessened.

The following comparison indicates the difference between the original and the present plant:—

| ORIGINAL. | PRESENT. |
|---|---|
| Two settings of three retorts. | Three settings of four retorts. |
| One setting of four retorts. | One setting of three retorts. |
| | One set of vertical condensers. |
| One set of vertical condensers. | Two sets horizontal condensers in cast-iron cases. |
| One scrubber. | One Livesey washer. |
| Two purifiers, each 5 feet square. | Three purifiers, each 10 feet square. |
| One station meter. | One station meter, capacity 15,000 per hour. |
| Two gasholders, 10,000 cubic feet capacity each—one at the works, and one at Alphington, about three miles away. | One gasholder, 70,000 cubic feet capacity. |
| | Two gasholders, 10,000 cubic feet capacity (original). |

Originally the mains began at 6 inches at the works, diminishing to 3 inches at Alphington, and continuing at this size to Fairfield. Now, however, they begin at 10 inches at the works, diminish to 6 inches at Station Street, Fairfield, and then to 4 inches and 3 inches to the end of the district.

The following comparative statement gives some idea of the progress made during the past eleven years:—

| Number of Consumers. | October, 1899. | September, 1910. | Increase. |
|---|---|---|---|
| Lighting . . . . . | 33 | 493 | 460 |
| Heating . . . . . | 8 | 261 | 253 |
| Total . . . . . | 41 | 754 | 713 |
| Total consumption (cub. ft.) . | 40,100 | 1,080,000 | 1,039,900 |
| Revenue . . . . . | £9 10s. 8d. | £368 8s. 0d. | £358 17s. 4d. |

For the first twelve months the total gas made, per station meter, was 1,894,000 cubic feet, of which 1,642,500 cubic feet were sold; leaving 13·3 per cent. unaccounted for. For the twelve months ending Sept. 30, 1910, 12,298,000 cubic feet were made, and 10,337,600 cubic feet sold; the unaccounted-for gas being 15·9 per cent. The gas unaccounted for during the last year is much larger than usual, due principally to the following causes: (1) 70,000 cubic feet extra gas in stock; (2), laying about two miles of new mains from 10 inches to 2 inches; (3), installation of new plant at the works.

Within a few years after taking over the works, the Council found that the plant was much too small to cope with the increasing demand; and various alterations and additions had to be undertaken. First of all, in 1904, the retort-bench was extended by building two extra bays, the hydraulic main was lengthened, and one setting of three retorts built in. About the same time two purifiers, each 6 feet square, were erected.

In order to increase the make per ton of coal, it was found advisable in 1907 to instal a vertical steam-boiler and steam-jet exhauster, the effect of which was to increase the make by about 1000 cubic feet per ton. A set of horizontal condensers was purchased and erected the same year. It was about this period that our naphthalene trouble began; and it lasted until the new plant was started last July. The cause of the trouble was that we were forcing far more gas through the plant than it could properly deal with; the foul main being too short, and the condenser, scrubber, and purifiers too small.

Having reported on this state of affairs to my Committee, it was decided to inspect the Newport gas plant, with a view of purchasing same; and in 1909 the Council resolved to buy the gasholder, purifiers, condensers, washer, and station meter, with all pipes and connections appertaining thereto. This plant was conveyed to Heidelberg, and erected under the joint supervision of the Shire Engineer (Mr. Tisdall) and myself, and put into operation in July last. The plant had to be erected 5 or 6 feet above the natural surface of the ground, to avoid trouble from the flood waters of the Yarra, near which the works are situated.

It is anticipated that in the near future it will be necessary to further increase the plant. The probability is that within five years the present consumption will be doubled, which will necessitate the erection of a retort-house on the new site, more holder accommodation, and an increase in the size of the principal mains.

I might supplement the paper with a few general remarks, which may be of some service—

(*a*) I find that heats can be better maintained by whitewashing the front and back walls of the retort-benches every six or eight weeks.

(*b*) The free distribution of small gas-rings has been found to materially increase consumption; and they are usually the forerunners of grillers and stoves.

(*c*) Pamphlets were prepared by the Shire Secretary, giving eight reasons why gas should be used for the purpose of lighting, ironing, and cooking, and also advertising burners, stoves, &c. These were distributed broadcast among the ratepayers. The reasons were as follows: (1) Because, as a ratepayer, I am a shareholder in the gas-works. (2) Because, by using the gas, and encouraging others to do so, I am increasing the output, and thereby causing the works to pay. (3) Because, when the works pay, my rates will be reduced. (4) Because it is handier, cleaner, and less dangerous than any other illuminant. (5) Because it is quite up-to-date. (6) Because I get the best light, with the least trouble and expense. (7) Because cooking becomes a pleasure instead of a burden. No dirt, no heat, time saved, and cost infinitesimal. (8) Because I can light my drawing-room fire in an instant, and obtain a splendid heat without dirt or smoke, at a cost of a trifle over 1d. per hour.

The result of issuing these pamphlets has been to largely increase the consumption for heating purposes. Every gas manager knows what economy is effected by improving the day consumption.

### Discussion.

The ACTING-PRESIDENT (Mr. S. E. Figgis, of Ballarat) expressed his thanks to Mr. Ambrose for his paper, which he said was full of points for discussion.

Mr. J. W. BEAN (Wangaratta) asked Mr. Ambrose whether he found a steam-jet exhauster better than an ordinary one run by a gas-engine.

Mr. AMBROSE said he did.

Mr. G. SWINBURNE (Melbourne) thought members should compliment Mr. Ambrose on his paper, which opened up a number of interesting subjects for discussion. The increased demand for gas at Heidelberg, as had been pointed out, was almost incredible. In 1899, the total month's consumption was 40,000 cubic feet; and in September, 1910, it was 1,080,000 cubic feet, which was sold at upwards of 6s. per 1000 feet. There was one thing about the Heidelberg enterprise which ought to be pointed out, and that was that the Town Council would be able to do plenty of things which other corporations and gas companies would be unable to do, because they got the works at a low price. If he remembered rightly, the original Heidelberg Gas Company was a great failure, and paid no dividends; and the Council acquired the works at one-quarter or one-fifth of their cost. They thus had a very good start. Their case was similar to that of Mr. Marsh, at Mentone. The Moorabbin Council got works at £3000 or thereabouts which cost £16,000; and, in consequence, Mr. Marsh was able to sell practically the cheapest gas in the Melbourne suburban area. He (Mr. Swinburne) was one of those who believed in municipalities acquiring gas-works, electric light works, and everything in the shape of service monopolies. In connection with the large increase in the demand for gas shown at Heidelberg, he thought it would be recognized that a gas-works might be run by a municipality at a profit which an electrical works could not realize. He had come to the conclusion that it did not matter, from a capital standpoint, whether electricity or gas works were put down. The latter would pay in a small town where electricity would not; for, in addition to the sale of gas for lighting, cooking, and heating, there was also the return from the bye-products. Electricity would not pay alongside gas competition excepting in a town with a population of from 20,000 to 30,000 people. It was a mistake for people to think a small town could run profitably both electricity and gas works. At present there was a strong spirit prevalent in favour of acquiring gas-works by municipalities. He had just arranged for the sale of a small gas-works to the Council at Geraldton, Western Australia. At Fremantle, where the Corporation were running the electric lighting, they had announced that they were about to take over the gas-works, because, in spite of the electric light and power competition, the local Gas Company were successful, and it was felt to be to the advantage of

the Corporation to acquire the gas-works. This was an example of a municipality having been brought to its bearings by a gas company. Mr. Ambrose had referred to the leakage at Heidelberg being high—16 or 17 per cent. He had given a good explanation of it. But it should be made plain, in connection with the criticism passed by certain English people on gas undertakings in Australia, that the percentage of unaccounted-for gas was not always the best criterion by which to judge them. If one compared it per mile of main, the result would be more favourable to Australian gas enterprises. The consumption per mile of main was probably from one-fourth to one-tenth of what it was in England; but the proportion of unaccounted-for gas was on a very different basis. Taking the length of mains of the Melbourne Metropolitan Gas Company—viz., nearly 900 miles—as compared with the consumption, it would be found that the same consumption would be obtained by some of the English gas companies with 200 miles of mains. In the cases of some small gas-works, such as those at Heidelberg, the mileage of mains was very high compared with the consumption. If the unaccounted-for gas per mile of main were the criterion, he thought the Victorian companies might compare with gas enterprises in any part of the world. Mr. Bean referred to the steam-jet exhauster. He (Mr. Swinburne) personally had not had much experience with these machines; but so far as he had gone, he was against using one in a hot country, unless there were very good condensing plant after as well as before it. He should like to congratulate Mr. Ambrose and those connected with him on the manner in which they had carried out their advertising propaganda, and the excellent reading they had provided in favour of using gas. It was in great contrast to the criticism which many of the newspapers had published on the question of electric light *versus* gas; and it showed that the Heidelberg Municipal Council thought the gas-works were well managed. This was one of the best replies that could be made to the criticisms referred to.

Mr. W. Pain (Bendigo) said he favoured the steam-jet exhauster. He had been working with one during the past ten years, and had never had any difficulty with naphthalene since he had used Maitland coal. Previously, however, when using Newcastle coal, he had been troubled with it. Now, whenever he got in Newcastle coal and had the slightest difficulty, he always employed an ordinary and a steam-jet exhauster to work before the condenser.

Mr. F. Tipper (West Melbourne) asked Mr. Ambrose how he found whitewashing the backs and fronts of the retorts helped the heating.

Mr. H. E. Bean (Warragul) asked what kind of wall Mr. Ambrose had erected 4 feet above the level of the ground. Was it iron or masonry?

Mr. Humphreys (Hamilton) stated that there was strong opposition at Hamilton from the Electric Light Company, who had taken away two or three of the Gas Company's best customers, and reduced the consumption by about 50,000 cubic feet per month. They, however, set against this loss the comparison of the accounts over the year. A few days previously, he obtained a contract for supplying the new Town Hall; and he thought the Company were also going to get the Mechanics' Institute. Members would therefore see that the electric light people were not getting things all their own way.

Mr. D. Warren (Footscray) said he had been engaged by a Syndicate in 1887 to examine the ground on which the Heidelberg Gas-Works stood, and also to look over the district, and report as to the prospect of the works being made payable. He had given an adverse report, and stated that he considered the site near the Yarra a very dangerous one; while the consumers were scattered over five or six miles to a point adjoining the then Collingwood Gas-Works. In addition, the coal had then to be carried some seven or eight miles. The result was that the Syndicate did not join in the Company formed, which was a failure almost from the start. The previous history of the concern must, however, enhance the credit of what Mr. Ambrose had since been able to do, and stamp him as a most vigorous gas manager; and he deserved all the compliments that had been bestowed upon him. As to the steam-jet exhauster, he had used one for 33 years, and had never found that the slightest quantity of naphthalene remained. His opinion was that no manager could afford to disparage the steam-jet exhauster.

Mr. Marsh (Mentone) said he must congratulate Mr. Ambrose on the progress he had made at Heidelberg. He (the speaker) was manager of municipal gas-works, which, he believed, had cost the original Company some £15,000 or £20,000; and they sold gas at 12s. 6d. per 1000 cubic feet and could not pay a dividend. The Moorabbin Council purchased the undertaking for £3200, and immediately reduced the price to 7s. 6d. The works were run at a loss for the first eighteen months; but an improvement was shown the next year, when a profit of £5 was made. This was increased to £100 the following year. The Council then reduced the price of gas to 6s. 8d. for lighting and 5s. 10d. for cooking. The improvement being maintained, there was a further reduction two years later, when the rates were made 5s. 10d. for lighting and 5s. for cooking. The purchase-money for the works was borrowed at about 4 per cent.; and there was a 2 per cent. sinking fund. The concern, therefore, had only to earn a profit of £200 per annum to pay its way; any further profit going towards reducing the price. The works consisted of a retort-house containing four beds of retorts, an exhauster, steam-boiler, four purifiers, 8 feet square, two sets of condensers, a station meter, and a 20,000 cubic feet holder. There were about seven miles of mains; four miles of them being 7-inch. There were 120 meters in use, and business was increasing rapidly. If the Municipality had had to purchase the works at their cost, the reductions in price could not have been made, as the profits on the working would not have been sufficient to pay the interest.

Mr. Rodgers (Warrnambool) said he was running about neck-and-neck with Heidelberg for the make of gas. During the twelve months ending Sept. 30 last, he made 12,388,000 cubic feet. Their unaccounted-for gas during the past year was 5·7 per cent., compared with 6·8 per cent. the previous year. In 1903, it reached 28 per cent.; and two years later, 19 per cent. The rates were 8s. 4d., 6s. 8d., and 5s. 10d.—the last being for cooking. It was hoped to get the lighting rate (8s. 4d.) down to 7s. 6d., when they had some new plant in operation. The make had increased more than 4 millions in two years. During the last twelve months, they had sold more gas for cooking and power than for lighting; the figures being 4,600,000 cubic feet for the former and 3,900,000 cubic feet for the latter.

Mr. T. Lord (Geelong) said he had been using a steam-jet exhauster for a considerable time. As to its position, the condensers should certainly be placed after it; otherwise they would be useless except for the purpose of eliminating tar. In his case, there was a set of condensers before the steam-jet exhauster, and another large set after it. He thought it was a very difficult matter to decide whether or not this exhauster had a tendency to cause naphthalene. With Newcastle coal, no matter what kind of exhauster was used, there was a liability to naphthalene trouble when working with high heats. His experience since the previous meeting, when he had offered a few remarks on Maitland coal, made him feel inclined to withdraw some of his observations as to it, since he had found it to be a good gas-making coal—the only objection being the quality and quantity of the coke it produced. There was not the slightest doubt that the best cure he had met with for naphthalene was Maitland coal.

The Secretary (Mr. C. W. Howlett, of South Melbourne) said when he visited the new works at Heidelberg he thought they furnished a good opportunity for Mr. Ambrose to explain what had been done there, and to demonstrate that a municipal gas-works could be run as profitably as a private gas undertaking. The Heidelberg and Mentone works, as had been explained, were obtained with a very small expenditure of capital; and Heidelberg especially was going ahead by leaps and bounds.

Mr. J. Lord (Williamstown) said, with regard to using steam-jet exhausters, he had been working with one for close upon thirty years. He used to have a great deal of trouble with naphthalene, and he altered the position of the exhauster several times in trying to get rid of it. But now he had his steam-jet exhauster behind everything excepting the purifiers; and ever since he had put it in the place mentioned he had not had the slightest trouble with naphthalene, either inside or outside of the works, whether he used Newcastle coal or any other kind.

Mr. Ambrose, in reply, said the steam-jet exhauster was a handy thing to have about the works; and if he had his recent experience over again, he would still have one. In answer to Mr. Swinburne, he might say the Heidelberg Council bought the works in the first instance for £3500. They had since spent £11,500 on them, and borrowed £3000 to lay new mains—making a total cost of £18,000. As to the whitewashing of retorts, the point was that if there happened to be any cracks about the bench, and the cold air got in, the heats would be affected. At Heidelberg, the front and back walls of the retorts were only 9 inches thick, and he found his heats were more satisfactory if he gave the walls a coat of whitewash about every three months. He might mention that he had been using Powlett slack coal for gas making. He carbonized it in fifteen retorts, and fired his furnaces with Newcastle coke. He obtained 9800 cubic feet of 15-candle gas per ton.

The Acting-President said the members were all obliged to Mr. Ambrose for bringing about an interesting discussion. Reference had been made to the unusual difficulties with which Mr. Ambrose had to contend in establishing the works at Heidelberg; and this merely emphasized the fact that much credit was due to him for bringing them up to their present high standard. Some remarks had been made on naphthalene and on steam-jet exhausters, which had elicited the fact that Maitland coals possessed the merit of dissipating naphthalene to some extent. He supposed these coals were very rich in hydrocarbons, and held the naphthalene in suspension. No doubt any rich gas would dissolve naphthalene. As to whitewashing the front and back walls of the retort-bench, he could quite substantiate what had been said as to its efficacy. There was nothing like keeping extraneous air out of the retort-benches; and in regenerative furnaces he found it was a very good plan to whitewash the whole bench, so that the smallest crack was discernible. The cleaner one kept the front of the benches, the more easily were cracks seen and remedied.

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Mr. Joseph Bowman (Sale) read the second paper, which was on the subject of

## DIFFERENTIAL PRICES FOR GAS.

The contents of this paper might, perhaps, have been more accurately described if it had been entitled "Selling Gas by Agreement." The question of varying the price of gas for different purposes is one that has engaged the attention of the gas profession all over the world for a number of years. In this country, at all events, it is an almost invariable rule that gas

should be sold at a lower rate for power and cooking purposes than for lighting. My idea was to vary the price of gas regardless of the purpose for which it was used; and I adopted the following method of bringing this about.

A few years after the celebrated "Land Boom," an era of retrenchment set in, and rigid economy was the order of the day. The price of gas—and, incidentally, gas managers' salaries—was cut down as low as possible. Kerosene was replacing gas in every direction. Storekeepers commenced to cut the price of oil; and as it came in free of duty, the prospects of the gas industry became very serious indeed. As I was in the position of having plenty of retort-house and holder accommodation, as well as a surplus of labour—the men not being fully employed—it was evident to me that a number of the works' charges were, in a way, fixed, and remained the same under considerable variations in the output. For instance, wages, interest, sinking funds on loans, general maintenance, &c. It, therefore, appeared to me that any extra consumption that could be obtained, up to the full capacity of the retort-house, would not increase these charge. With this idea in my mind, I calculated what the cost of producing extra gas would be, taking into account only the cost of the coal and purification, less the value of residuals obtained, and the following was the result:—

| | £ | s. | d. |
|---|---|---|---|
| 1 ton of coal into shed | 1 | 7 | 6 |
| Purification, water, and proportion of wear and tear (say) | | 2 | 0 |
| | 1 | 9 | 6 |
| Less value of residuals (allowing a percentage of fuel for extra firing)— | | | |
| | | s. | d. |
| 9 cwt. of coke at 1s. 3d. | | 11 | 3 |
| 11 gallons of tar at 3d. | | 2 | 9 |
| | | 14 | 0 |
| Balance | | 15 | 6 |

This leaves the net cost per ton of coal at 15s. 6d. Assuming the selling quantity of gas obtained per ton to be 9000 cubic feet, the net cost of production of this extra gas produced would, therefore, be 1s. 9d. per 1000 cubic feet.

Having formulated a plan for disposing of this, what might be termed, "surplus gas," I laid it before my employers for their approval or otherwise. It was a difficult argument to prove, as we were only just paying our way at 12s. 6d. per 1000 feet. The Gas Committee could not see how—in the existing state of depression—any advantage was to be gained by selling gas at (say) 8s. 4d. per 1000 cubic feet. However, I was allowed to give my scheme a trial in order to test its merits or demerits.

Every consumer's account for a period of three years was made up, and an average struck of the consumption and its money value—three years being adopted as the basis owing to the fact that the output had been steadily decreasing for a long time. Consumers were then interviewed, and the following proposition placed before them: If you are prepared to increase your consumption by 25 per cent., we will give you an additional 50 per cent. free of charge, and make a reduction of 4s. 2d. per 1000 cubic feet for any gas consumed over the extra quantity allowed.

An example may better illustrate my meaning. Suppose a consumer was burning 1600 cubic feet per month, which, at 12s. 6d. per 1000 cubic feet, would cost £1, he was asked to increase his consumption to 2000 feet per month, which would make his payment 25s. If he agreed to do this, he was allowed an additional 1000 cubic feet free of charge; and all gas consumed above this amount (3000 cubic feet) would be charged at the reduced rate of 8s. 4d. per 1000 cubic feet. This meant that we handed over to the consumer 1400 feet of gas for an extra payment of 5s., which quantity, at 1s. 9d. per 1000, would only cost (say) 2s. 6d.; leaving a profit of 2s. 6d. per month on the transaction. The amount of profit would, of course, vary according to the size of the account. Each consumer who agreed to the conditions was asked to sign an agreement. [See preceding form.]

*No.*

**SALE BOROUGH COUNCIL.**

**GAS DEPARTMENT.**

AGREEMENT WITH CONSUMERS FOR GAS SUPPLY AT A SPECIAL RATE.

_____ 191

I _____ of _____ street, Sale, hereby agree to pay the Sale Borough Council the sum of _____ Pounds _____ Shillings and _____ Pence per month for twelve months from the _____ instant such sum to be subject to the usual discount if paid in accordance with the conditions specified on the Council's gas-rate notice form now in use; and in consideration of such sum being paid as aforesaid the Council agrees to make no further charge for the gas used by the said _____ during the above-mentioned twelve months unless the quantity consumed by him exceeds _____ cubic feet. Any excess over this quantity to be paid for at the rate of 8s. 4d. per 1000 feet.

Signed _____

Date _____

Witness to the above signature,

_____

Manager, Gas-Works.

The idea caught on at once, and was most favourably received by consumers. I may state that I was perfectly well aware there was practically nobody in the town using as much gas as he could do with—very few stoves were used, and, as stated, retrenchment was the order of the day. When the scheme was adopted, we were in a position to point out to those who complained of the price of gas that they had only to increase their consumption to secure a considerable reduction.

The agreement applied to both small and large consumers; and herein lay, apparently, one of its weak points, as the man who had been burning comparatively little had a chance to blossom out into a large consumer at a low rate, while the consistent user of a larger quantity would not gain the same advantage. In practice, however, this did not happen. New consumers were dealt with according to the size and style of their premises, and an agreement arrived at in this way.

As the agreement extended over twelve months—in order to make it as easy running as possible—it was arranged that if the full amount of "free" gas was not used each month, the balance could be used at any other time, provided the total allowance was consumed within the period covered by the agreement. A statement was printed at the bottom of each notice, and filled in at each monthly reading, showing the amount of gas used, and the balance available to the end of the term. Taking the instance quoted previously, the notice would read:—

| | |
|---|---|
| Amount of gas available for twelve months to (say) Oct. 31 | 36,000 cubic feet. |
| Amount of gas consumed to (say) June 30 | 30,000 ,, |
| Balance available—four months to run | 6,000 ,, |

Consumers soon got into the way of examining their accounts to find how the gas was "running out." If they found they were exceeding their average monthly allowance, some might curtail a little, while others would be quite prepared to pay for any excess used at the rate of 8s. 4d. per 1000 cubic feet when the term of the agreement expired. Instances arose where the excess was considerable, and the consumer found it inconvenient to pay the whole amount at once. To suit such cases, subsequent agreements provided that any excess over the available quantity would be charged the month in which it occurred.

If, at the expiration of the agreement, it was found that the available quantity had not been consumed, it was lost to the consumer; but, in the event of a large excess occurring during the following term, a reasonable allowance was made. Business people often gained an advantage in being able to use the excess gas in their homes for lighting and cooking. We were thus frequently enabled to obtain a footing in a private house, where otherwise the ordinary price of gas would have kept us out.

One of the most striking and comforting benefits of the scheme was that a consumer's account was the same amount winter and summer. We all know the dissatisfaction that arises during the winter months over the gas bills. Under this system, however, the agreement consumers look upon the visits of the collector with the greatest equanimity. They know they will be able, during the summer months, to ease off the consumption in order to make up for any extra gas burnt during the winter (the agreements generally terminating at the beginning of the autumn); and this tends to create a much better feeling between the supplier and the consumer, while at the same time helping on the consumption materially.

As a fly is likely to get into every pot of ointment, so also did the agreement system develop a slight defect. I emphasize the word "slight." There was a tendency on the part of some consumers to make their agreements balance every year, and thus, in a way, stop progress. But this, I think, could be fairly put down to the non-progressive nature of the town. Being solely agricultural, and surrounded by large estates, it has remained dormant, and there are no more people in it now than there were twenty years ago.

The system described was first brought into vogue in the year 1893, and has thus had a run of seventeen years to prove its worth—being still availed of by one-third of the consumers. No attempt has been made of late to push it, for two reasons: The first is that continuous reductions in the ordinary selling rate have been made, the price now being 9s. 2d. per 1000 cubic feet; and the second, that the gas consumption is fast approaching a point where extra labour would have to be employed to cope with the output. As a means of fighting competition without possibly losing revenue, it seems to be worth a trial, especially where gas is high priced. Lots of small works would be very much improved by working closer up to their maximum capacity, and extra sales of residuals might give better results than those I have quoted.

In conclusion, I might just state that, in the early days of the system, one was often met with the argument: "Why do you sell gas to one man at a high price, and at a lower rate to another? This is a democratic country, and all should be treated alike." I endeavoured to point out as gently as possible that it was only the "surplus gas" that was sold at the lower price. Personally, I do not see why a gas-works, after having provided for all its customers, should not hold a continuous "clearing sale" of its surplus production or stock, just the same as our leading storekeepers do. In the agreement system, I have made an endeavour to work this idea out.

**Discussion.**

The ACTING-PRESIDENT (Mr. S. E. Figgis, of Ballarat), in opening the discussion, expressed the hope that all the members who were selling gas at differential rates would give the meeting their views on the matter.

Mr. FOSTER (Oakleigh) said he thought Mr. Bowman had had a great deal of courage to go to his Committee and convince them that selling gas at 8s. 4d. per 1000 cubic feet would be more profitable than vending it at 12s. 6d., when they were getting the latter rate. He could hardly understand why a consumer should get gas cheaper for power than for lighting. If anything, he thought the man who wanted gas for lighting should have it at the lower price. Mr. Bowman seemed to have this idea in the figures he had given. There was another point Mr. Bowman had brought out—viz., as to getting a footing in a private house. As all knew, if once people were induced to use gas in any small way, it usually meant an increase of business before very long. Another matter touched upon was working up to a maximum capacity. This often meant the difference between a paying and a non-paying concern. Mr. Bowman had shown that, even by reducing the price of gas, the undertaking would pay better by working up to the maximum.

Mr. J. A. AMBROSE (Heidelberg) said he found by charging a reduced rate for cooking they were increasing their day consumption at Heidelberg.

Mr. HUMPHREYS (Hamilton) said he quite agreed with Mr. Bowman, and considered it was a very fine scheme to have differential rates. The electric light people at Hamilton charged 9d. per unit for lighting and 4d. for power, which was more than 50 per cent. reduction for the latter. His prices were 10s. 10d. and 9s. 2d., less various discounts. He was quite in accord with the idea that gas should be supplied for power as cheaply as possible. In Hamilton, a profit of 25 per cent. was made per ton of coal carbonized; and he was of opinion that in all cases where this profit could be shown, rates might advantageously be lowered.

Mr. E. TIPPER (Box Hill) said he thought it was quite right to have two rates for selling gas—one for the day load and the other for the ordinary night load; but it was a different matter to do what Mr. Bowman had done, and go in for a bit of "dumping" in one's own district. Under his scheme, the consumer, it seemed, could not know where or how he stood, excepting once a year. How were the floating population—people who were coming and going daily—to be treated? Further, where did the small consumers, who did not require very much gas, come in? In order to run Mr. Bowman's scheme in connection with works of any size, it would require a very large office staff to keep the accounts square. In his opinion, a differential price must be devised to bring the consumption up to as near an average load as possible throughout the 24 hours. Thereby storage and fixed charges could be reduced; but the carbonizing cost would be the same, whether it were day or night work.

Mr. R. BEARUP (Stawell) said he had taken Mr. Bowman's place at Sale for a short period; and, being a stranger there, he found it extremely difficult to understand why the agreements were made with only a certain number of people. Before he left, however, he grasped the meaning of the system. He thought Mr. Bowman had accomplished his object—viz., bringing about an increase of consumption; and from his experience he had come to the conclusion that the consumption in Sale was larger than that of any other town of the same size in Victoria.

Mr. F. TIPPER (West Melbourne) said there were, no doubt, a number of small consumers at Sale who probably did not burn more than 200 cubic feet of gas per month. It would not matter if they were given a supply of 10,000 cubic feet, as they would have no use for it. Yet they were asked to increase their consumption, according to Mr. Bowman's agreement, by 25 per cent. Supposing they increased it by 50 per cent., and burnt 300 cubic feet per month, they would be immediately made a present of another 100 cubic feet, which would give them the use of 400 cubic feet of gas per month for 3s. 9d. If they were consuming gas at this rate, they would then be entitled, in the terms of the agreement, to any quantity over and above the 400 cubic feet at the rate of 8s. 4d. A consumer, however, who was burning 1600 cubic feet per month must increase his consumption to 2000 cubic feet before getting any reduction whatever. It appeared to him that the agreement system must defeat itself from this fact alone. Mr. Bowman said the system was introduced seventeen years ago. In order to find out what benefits had been derived from it, he (Mr. Tipper) would like to know what increase had taken place in the number of consumers and the consumption of gas since its adoption. He was not in favour of differential rates, as he held that gas should be all one price, and as cheap as possible.

Mr. J. W. BEAN (Wangaratta) said he agreed with Mr. Bowman that there should be a surplus price, and that from time to time, as the profits warranted, the price of gas should be reduced all round. At Wangaratta there were two prices—viz., 10s. for lighting and 7s. 6d. for cooking. A number of consumers did not care to pay at the rate of 10s. per 1000 cubic feet for a boiling-ring; so the Company undertook that in cases where a ring or a griller was in use they would charge half the consumption at the 10s. rate, and the other half at 7s. 6d. There was no difficulty keeping the accounts, and it worked out very well—often saving the Company the cost of putting in an extra meter. It would not pay to put in an extra meter for every griller where the consumption was only some 500 or 600 cubic feet per month.

Mr. E. TIPPER (Box Hill) asked whether, under the half-and-half system of charging, there was not a minimum fixed, so that a loophole was not left for people to get a boiling-ring put in which they did not use at all, and thereby secure the benefit of the lower rate.

Mr. BEAN said he would soon know. If the consumer did not use the boiling-ring, attention would be drawn to the fact; and the reduction from the higher rate would not be allowed. His experience was that after using a boiling-ring for a short time the consumer would go in for a griller or a cooker; and then the Company fixed a separate meter, and charged at the rate of 7s. 6d. for cooking and 10s. for lighting.

Mr. RODGERS (Warrnambool) said it was quite evident that Mr. Bowman had accomplished the object he had been aiming at; but, personally, he thought the adoption of such a complicated arrangement must greatly increase the bookkeeping of the general run of gas managers. The Warrnambool rates were 8s. 4d. for lighting and 5s. 10d. for cooking and power—no discounts being allowed. He very often put in a service for a griller and a couple of lights, and gave the consumer one meter at a middle rate—viz., 6s. 8d. People were certainly entitled to some consideration for using a griller; and he had never known a case where it had been installed simply for the sake of obtaining a reduction in price. Those who had grillers supplied certainly used them, and invariably soon went in for a cooking-stove.

Mr. E. TIPPER said he found it was advisable to give 5 per cent. discount to all customers consuming 5000 cubic feet of gas per month and 10 per cent. to those consuming 10,000 cubic feet, in addition to giving them the advantage of the different prices, which were 5s. for engines and 6s. 8d. for lighting.

Mr. T. LORD said with regard to differential rates, particularly for cooking or power, Mr. E. Tipper struck the right thing in saying that equalizing the load night and day was an important point. At Geelong they had two rates—6s. 8d. being their general charge for lighting, and 5s. 10d. for stoves and engines. It was simply with the idea of equalizing the load that the reduced charge was first brought into existence; and he felt confident in saying that the object had been attained. At present something like 48 per cent. of the consumption was in the day time; so that they were getting their load fairly well equalized. Allowing for slow days, such as Sundays, when the consumption was somewhat less, they had not to make more gas at night than in the day, and there was no rush to get the holders filled up by the night. As the results of Mr. Bowman's differential rates had not been analyzed, it did not appear whether or not they had equalized the load. He believed in differential rates; but he could not see why a middle rate should be allowed to people who were using a boiler-ring or a griller. Charging half the gas used on the lighting rate and half on the cooking rate was, in his opinion, very unsatisfactory. He thought it far better to have two set prices.

Mr. HUMPHREYS (Hamilton) said he disagreed with Mr. Lord's view that there should be no reduction for grillers or rings. Since he had been at Hamilton, he had fixed forty grillers, where previously there had been only two or three. Whenever he found people were using a ring, he always induced them to try a griller. He had replaced ten grillers with stoves. He was quite sure he would not have been successful in working in his stoves had he not induced the people to use a griller at first by offering them a lower rate. In many cases the addition of the griller had increased the consumption from not more than 300 to about 900 cubic feet per month.

Mr. RODGERS, in reply to an inquiry from the Acting-President, said his day consumption varied during the summer and winter, but he could give it for the year. At 8s. 4d., for lighting only, it was 3,974,000 cubic feet; at 6s. 8d., for stoves and boiling-rings, it was 1,737,000 cubic feet; and at 5s. 10d., for engines and stoves, it was 4,624,000 cubic feet. He had 730 consumers, and 200 users of cooking-stoves. Between 30 and 40 grillers were in use, and 35 engines were working by gas. In summer the day load was greater than the night load.

Mr. J. W. THOMPSON (Melbourne) said a good deal depended on what periods constituted day and night. The Metropolitan Company calculated the winter day from 7 a.m. to 5 p.m., and the summer day from 5 a.m. to 7 p.m. The summer day consumption, therefore, extended over 14 hours, while the winter day only consisted of 10 hours. At West Melbourne, the output for twelve months averaged about 53 per cent. day and 47 per cent. night. During the summer, the day consumption was considerably greater than the night—about 60 per cent. of the total output.

The ACTING-PRESIDENT said the subject of differential prices was a very debateable one; and it had been a source of much controversy among gas managers in England. Personally he did not see why they should not allow differential prices, and so increase their consumption by fostering the use of gas in the daytime. The electric lighting people had all sorts of differential rates. If they looked at the electric rates for power as compared with lighting, they would see a wonderful discrepancy. In Ballarat they had latterly been forced to reduce the charge for gas used for power, and had brought it down practically to 4s. 6d. per 1000 cubic feet. Their rate for cooking and lighting was the same—viz., 6s. 8d., with discounts ranging down to 5s. 10½d. There was a certain ethical bearing on this question. The lighting consumer did not look at it from the Company's standpoint. He certainly could not be convinced that it was good morality to rob Peter to pay Paul. He argued that he was a good consumer; and it was beyond his comprehension why the "other fellow" should get gas cheaper than he did. In Ballarat they had

been endeavouring to increase the consumption of gas by supplying people with grillers at the low rental of 1s. per annum; and during the last two or three years they had put out upwards of 1200. Although Ballarat had been passing through very trying times, inasmuch as their leading industry (gold mining) was practically extinct, and notwithstanding the fact that the Gas Company had very strong opposition from an electric lighting concern, yet, taking the figures in comparison with those of five years ago, it appeared that they had slightly more than held their own against their competitor. He put this down solely to having fostered the consumption of gas by supplying grillers at so very low a rental. Their griller was an excellent one, and only one type was supplied. If his customers wanted anything better than a griller, they had to get a stove. In this way the introduction of the griller led to people becoming better class consumers. It might be that later on the Company would be compelled to have a differential rate for cooking as well as for power; but as yet they saw no necessity at all for it.

Mr. TAYLOR (Benalla) said that he had not been very long in Australia; but, speaking from his experience so far in Benalla, he was strongly in favour of the differential system. It should be pointed out to the consumer who complained of having to pay a higher price for gas for lighting that the cost of lighting by gas had to be compared with that of lighting by kerosene—taking into consideration the amount of light obtained from an inverted burner in comparison with a kerosene lamp—but that cooking and heating gas had to compete with the price of wood. In the country, people could buy enough wood for 8s. to last them for a month; and a working man's wife took a lot of convincing before she would spend (say) 12s. on gas. Of course, one could point out the advantages of a gas-stove over a wood-fire; but she always looked at the 4s. per month extra that it cost. Unless gas could be supplied cheap enough to compete with wood in country towns, one would have trouble in getting people to use cookers.

Mr. D. WARREN (Footscray) said they had differential rates in his town. The engine rate was 33 per cent. below the ordinary charge—this being 5s. and the engine rate 3s. 9d. Engines and cooking-stoves were all using gas of the day production. The daily output was, as near as he could average it, 200,000 cubic feet. They sold gas for motive power at about cost price. Coal cost probably £1 per ton; and the average make was 10,000 cubic feet. This worked out at 2s. per 1000 cubic feet, leaving 1s. 9d. for wages, &c. Of course, they had the benefit of the residual products, which certainly compensated them. The reduced price practically stopped the progress in the district of electric motor power and suction gas. Generally speaking, however, he was not altogether in favour of differential rates. At Footscray, large manufacturers were using the gas because it was cheap; and they had 200 and 300 light meters installed. Profits were good, though not very large; and the Gas Company were doing something towards keeping the factories in the district, and popularizing the use of gas. The population of Footscray had grown from 18,000 to about 25,000 in a comparatively short time; and he thought gas had something to do with it.

Mr. BOWMAN, in reply, said he was pleased to hear the discussion that had ensued as the result of his paper, as it was only by the free expression of opinion that they could get information of any value. Mr. E. Tipper had raised the question of day load and storage capacity. He (Mr. Bowman) had pointed out in his paper that he had ample holder accommodation, and that it did not much matter whether gas was burnt by day or by night. They did not charge quite so heavily in the daytime as at night; but the holders were always going down in the daytime, the leeway being made up at night. As to the remark that had been made about a consumer not knowing where he stood, the monthly notice had a foot-note showing the amount of gas he had used and the balance available for the remainder of his term. If consumers used more than they were entitled to under the agreement, they seemed to be quite willing to pay for the difference. He did not trouble about the floating population, as they paid the ordinary rate. Small consumers were certainly difficult to manage; but the minimum under the agreement system was 500 cubic feet per month. He regretted his inability to supply the figures asked for by Mr. F. Tipper; he had not brought them with him. He might say, however, that his consumption had almost doubled in seventeen years, and was steadily increasing. His present output was within a few feet of 6 millions per annum, compared with 3½ millions seventeen years ago. The original price of gas was 13s. 4d. per 1000 cubic feet, and it was now 9s. 2d. to the ordinary consumer and 6s. 8d. for stoves. The works belonged to the Municipality. There was a great advantage in this respect over private ownership, because as soon as the works commenced to show a profit the Council usually went in for extending mains or cutting the prices down. He certainly believed in municipal ownership of gas-works. Their capital was £7700, and they had wiped out a loan of £5000 on which 10 per cent. interest was paid for twenty years. They were now only paying 7 per cent. on £2700, which was something over £200 per annum outlay on interest and sinking fund. They also had a reserve fund of £1300 to provide for accidents.

### THE QUESTION BOX.

At the close of the discussions, the subjects in "The Question Box" were considered. The remarks upon these were given in the "JOURNAL" for the 4th of April (p. 34).

## WAVERLEY ASSOCIATION OF GAS MANAGERS.

### Annual Meeting in Edinburgh.

The Ninety-Fifth Meeting of the Waverley Association of Gas Managers was held in the Cathedral Hotel, Cockburn Street, Edinburgh, on Friday. Mr. R. W. COWIE, of Dalkeith, presided over a good attendance, and extended a hearty welcome to the members.

The HON. SECRETARY (Mr. Cuthbert Hamilton, of Loanhead) read apologies for absence from Mr. G. Keillor, of Broughty Ferry, Mr. J. W. Carmichael, of Barrhead, Mr. J. Hepworth, of Edinburgh, Mr. J. M'Laren, of Duns, and Mr. William Blair, of Helensburgh.

The PRESIDENT called attention to the financial position of the Association, which, he said, showed, in comparison with that of a year ago, that they were in a healthy condition.

### PRESIDENT'S ADDRESS.

The PRESIDENT then delivered the following address.

The Waverley meetings have always been in the past more or less of an informal character, and though now the Association is possessed of a written constitution, still the meetings are understood to be informal, and of quite a conversational nature. Any member is at perfect liberty to raise any subject for discussion, whether it is mentioned in the address or not. Should any member have had a difficulty or unusual experience during the past winter, and would like some expression of opinion on it, he is invited to voice it, and I am sure further light will be thrown on it by someone present. Our meetings are for mutual help. I do not know of any body of men, association, or industry, where there is such a free exchange of opinion and information as in our various Gas Associations, and it is largely because of this, that the industry is so prosperous.

No one with any knowledge of the profession past and present, or with the smallest outlook on the future, can for a moment doubt the wisdom of gas managers, no matter how small the works under their charge, being connected with the Associations, for the success of the industry is largely due to such connection; and it is difficult to understand why, in some cases, managers are discouraged from attending these meetings when the undertakings they represent would undoubtedly benefit from attendance.

While we members of the Waverley Association like to think of ours as the "Parent" Association, we recognize the North British Association somewhat in the way that a small boy does his big brother; and I think, if at all possible, each of us and every gas manager in Scotland should be members of the North British Association.

It is indeed gratifying to all gas managers to know that the memory of the late William Young, whom we are proud to think of as a Waverley man, is to be kept in such a practical and permanent manner; and the Council of the North British Association are to be congratulated on the method they have adopted and the energetic manner in which they have carried through the preliminary arrangements, and secured the required funds.

One of the most hackneyed phrases used in gas-works parlance is that, "Profits are made in the retort-house. But to this must now be added, "and are maintained in the consumers' houses." Immediate attention must now be paid to all complaints; and these in most cases are due to either lack of pressure or badly-regulated incandescent burners, or too small internal piping. No gas-works should now be without a gas-fitter, or a staff of gas-fitters, to attend to all complaints at once. With regard to pressure, we must see to it that a sufficient and constant pressure is maintained in the distributing mains.

One difficulty I have experienced in Dalkeith is with wet meters. When these were made, they were suited for a distribution pressure of from 10-10ths to 20-10ths; but with a pressure of 30-10ths, many of these meters are very unsatisfactory—the gas popping out frequently, and always at a most inconvenient time. In Dalkeith, the Gas Company do not provide meters other than prepayments, and these only on certain conditions; and it can be understood that it is not always possible to get the proprietors of the property to put in a new dry meter.

#### CARBONIZING METHODS.

Every one who reads the technical journals must be intensely interested in the process of evolution through which carbonizing methods are passing. A very few years ago, light charges of short duration were recognized to be the proper thing, and were practised almost universally. With the advent of power discharging from through retorts came heavy charges and longer time for carbonizing, giving much better results. It seems, however, that the vertical retorts in all large gas-works will eventually displace horizontals or inclines. They have so much to recommend them in the almost total absence of smoke, dirt, noise, and hard manual labour, and in producing such splendid results as published at times in the Technical Press in increased yield of gas, superior coke, tar, and liquor, and other advantages.

For the small gas manager, all this is very interesting; but unless through time he gets into a large works, he never will have any practical experience of these new systems. In our small gas-works, the practice will continue to be to keep up our heats as high as we can without burning-out our settings, and without wasting coke as fuel, and charge as heavy as possible, though we

must not have retorts charged so heavy as to be difficult to draw, or the coke will get too much broken in discharging.

In Dalkeith, we usually have splendid heats in the retorts. The settings are on the regenerative principle, and designed by the late Mr. Bell. It will not be out of place for me to relate a rather unusual experience that I had during last winter. About 1 p.m. on Dec. 31, my attention was drawn to the large amount of very thick tar in the tank at the condensers, and on looking into the matter, I found that all the heavy tar was coming forward to the condensers instead of going direct from the foul main to the large tar-tank. In about three or four hours' time the seals would have become choked, and the passage for the gas blocked. I found the hydraulic main was nearly filled with a hard substance, which I thought was pitch; but as the gas passage there was clear, we concentrated our efforts to clear the condensers, foul main, and tar-pipes from the very heavy tar and pitch. By dint of hard working, we got the whole of these pipes clear before dark, except the foul main. But as it was only half filled with pitch, there was a clear way for the gas; and on the Sunday, Jan. 1, with the aid of steam, it was completely cleared. The hydraulic main, however, refused to be cleared even with steam; and while gas was making, we had to clear a space below each dip-pipe with chisel bars, and keep these clear till we could let the section of the main off. On removing the cover of the hydraulic main, I was very much surprised to find not pitch, but a solid and hard mass of crystals and pitch about 7 or 8 inches thick, and which could only be removed by means of a heavy hammer and chisel bars. A sample of the crystalline salt (ammonium chloride) may be seen by anyone present.

Since this experience, I have fixed a 1¼-inch pipe to each section of the main from the liquor pump, so that I shall be able to flush out the main once a week, and thus avoid a recurrence of the crystals. So much for one of the nasty experiences a gas manager sometimes has about New Year time.

### A Long-Standing Complaint.

I have referred to the need of supplying gas at a constant and sufficient pressure; and I would like to explain how we overcame a long-standing complaint of lack of pressure. The complaint came from Dalkeith Palace, one of the country seats of the Duke of Buccleuch. The palace, stables, and laundry are supplied through two meters. A small station meter of 2500 cubic feet capacity supplies the palace, and a 60-light dry meter supplies the stables and laundry. These meters are situated in a small house at the road-side edge of the policies, and are about 300 yards from the palace, 700 yards from the stables, and 1230 yards from the laundry. Both meters were till recently supplied by a 3-inch main connected to the town's mains at a point 300 yards distant.

For the purpose of getting some idea of the difference in level between the meter and palace and between the meter and stables, a note of the pressures was taken during the day when there was no gas being used. The difference in pressures taken at the laundry and meter was 10-10ths, showing a difference in level of about 100 feet. The difference between the pressure at the palace and at the meter was 3-10ths, showing a difference in level of at least 30 feet. In both cases the meter is at the highest point. The pipe from the meter to the palace is 3 inches diameter; and there it is branched off into three 1½-inch diameter services supplying the palace at three different points. In the winter of 1907, the pressures at different points were stated to be as under:

| | |
|---|---|
| At the gas-works, outlet of governor | 29-10ths |
| At the palace, meter inlet, 1000 yards distant | 22-10ths |
| At the palace, meter outlet | 20-10ths |
| At point No. 1 in the palace | 7-10ths |
| At point No. 2 in the palace | 11-10ths |
| At the stables | 8-10ths |
| At the laundry | 3-10ths |

It will be seen at once that at no point in the palace or the laundry and stables was there a satisfactory pressure. Prior to the winter of 1908, a Keith and Blackman water-driven compressor was installed by His Grace for increasing the pressure to the stables and laundry only. This completely cured all complaints from that quarter, and the pressures taken with the compressor were: Stables, 40-10ths; laundry, 33-10ths. These pressures could be either increased or lessened as desired. When this compressor was working, it caused a fluctuation or pulsation in the gas lights in the palace. With a view to increasing the pressure in the town's mains as well as to help the palace, about 2 tons weight was added to the heaviest gasholder; and although this increased the pressure at the works by 4-10ths, the pressure at the palace was only increased by 2-10ths, and varied slightly with the consumption in the town.

After the matter had been considered, it was decided to lay a new 4-inch main from the works to the palace direct from the gasholder outlet, giving the full holder pressure constantly. It was at this time that I was appointed to Dalkeith; and one of my first duties was to lay the new 4-inch main. The streets through which the pipe was laid were so narrow, and contained so many cross drains, that I decided to lay the usual cast-iron coated pipes with open lead joints instead of Mannesmann tubes.

At all points, such as at cross streets, where a branch connection might be wanted at some future time, branch pieces were fixed. This main was tested with the gas on at holder pressure by means of a test meter, as well as by flame at each joint; and a good sound job was thus secured.

The winter following the laying of this pipe, it was found that, although the pulsation in the house lights was cured, and the cooking-tables were getting a good supply, still there was not sufficient pressure at the various points in the palace. At point No. 1, the pressure was only 11-10ths; and at point No. 2, 15-10ths, with a pressure at the meter of 30-10ths. The stables and laundry only when supplied through the water-driven compressor continued to get a good supply. It was very evident that the piping arrangements of the palace were too small and defective; and to have renewed these would have necessitated the breaking of walls, which was not to be thought of. After further consideration, it was decided to put in a compressor at the gas-works, and raise the pressure till the whole palace, stables, and laundry had a sufficient supply.

I decided on having a compressor which would be able to deal with much more than was immediately required of it—one which would be able to "boost up" the pressure in the town's mains if necessary, and, if called upon, would supply high-pressure gas for street lighting, should the Local Authority ever contemplate adopting the latest and best form of public lighting. In order that the palace supply would not be affected were this main to be used as a high-pressure main, I had fixed a Milne's high-pressure governor at the inlet of the meter. This governor was set to give 45-10ths pressure, no matter what the pressure on the main should be above this. With 45-10ths at the meter, we had at Point 1, 20-10ths; and at Point 2, 30-10ths.

The whole of the foregoing pressures were taken with all the gas-jets burning in the palace, stables, and laundry, and with the cooking-tables all lighted. When the cooking-tables were turned off, however, during the last test, the pressure at point No. 2 rose to 40-10ths, even though point No. 2 was supplied from a different service or section than the cooking-tables. In order that the pressure over the whole palace would remain constant, in spite of the putting on or off of the cooking-tables, on each of the 1½-inch service-pipes a Peebles mercurial governor was fixed; and from that time till now, we have never had a complaint. A number of chart diagrams of pressures taken after those were fixed, and throughout the winter, always showed a line almost as if it had been drawn by the aid of a ruler. One might naturally think that with such an increase of pressure there would be a tremendous increase in the amount of gas consumed; but the difference is rather the other way.

Prior to the introduction of the compressor, almost without exception the burners were of the flat-flame type; but in view of the compressor being installed every place was fitted with inverted incandescent burners. The long dark corridors in the basement were fitted with, and splendidly lighted by, "Nico" bijou burners, consuming 1 to 1½ cubic feet per hour. The "Graetzin," "Bray," and the "Cool" burners were used throughout the palace; and in many cases one or two incandescent burners displaced a number of flat flames, and gave a very superior light.

I would direct attention to the following readings of the meter taken last winter during one day with the compressor and with incandescent burners, and taken about the same date last year without the compressor and with flat flames.

*Consumption of Gas each Hour at Palace Meter.*

| Dec. 22, 1909. | | Dec. 28, 1910. | |
|---|---|---|---|
| Time. | Cubic Feet. | Time. | Cubic Feet. |
| 10 a.m. to 11 a.m. | 450 | 10 a.m. to 11 a.m. | 375 |
| 12 noon | 500 | 12 noon | 275 |
| 1 p.m. | 425 | 1 p.m. | 300 |
| 2 ,, | 375 | 2 ,, | 175 |
| 3 ,, | 300 | 3 ,, | 285 |
| 4 ,, | 500 | 4 ,, | 240 |
| 5 ,, | 700 | 5 ,, | 525 |
| 6 ,, | 975 | 6 ,, | 425 |
| 7 ,, | 950 | 7 ,, | 600 |
| 8 ,, | 950 | 8 ,, | 550 |
| For 24 hours, 11,250 cubic feet. | | For 24 hours, 6600 cubic feet. | |

In 1910, Dec. 22 was a very clear day, and the 28th was selected because the weather in it corresponded with that on Dec. 22, 1909.

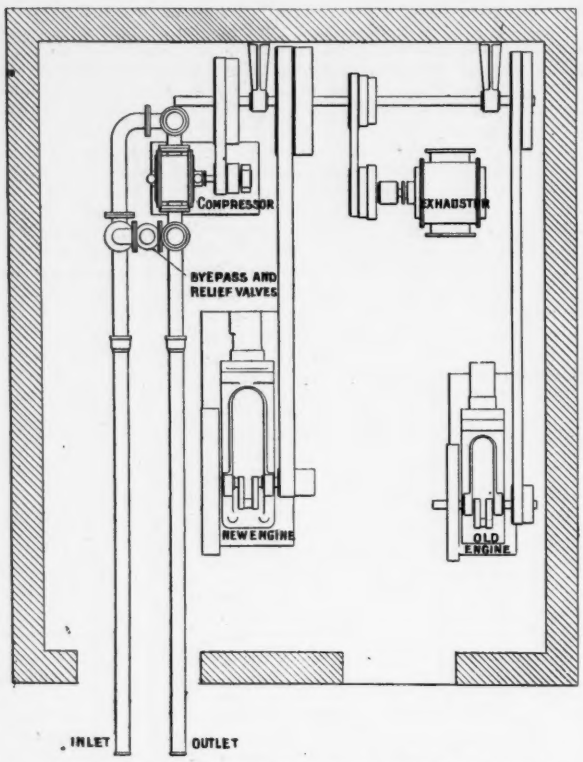
This shows a very great saving to the household expenses of the palace, and some might say a loss to the Gas Company. But we do not think so; for we have now a contented large consumer, instead of a complaining one. We have, too, the consciousness that they are getting good value for their money.

### The Compressor.

From the drawing, it will be noticed that our exhauster is driven by a gas-engine and countershaft. I decided to drive the compressor from the countershaft, and instal another gas-engine of a slightly larger size, so as to provide a stand-by. The existing engine was large enough; but I thought it better to have one slightly larger. It is quite likely that another engine would have been got in any case as a stand-by for the exhauster. On the countershaft there is a fast-and-loose pulley for each engine; so that the one engine may be stopped and the other started without ever stopping the exhauster and compressor. The compressor is used from the time the family come till they leave; and during this period it never stops day or night. This would be impossible, of course, without two engines.

The compressor was made and fixed by Messrs. James Milne and Son, of Edinburgh, and so far has given every satisfaction. It is capable of handling 2500 cubic feet per hour at 5 lbs. pressure and 350 revolutions per minute. It is made with a view to

reducing friction to a minimum ; and the shaft runs in ball-bearings ; the only wear and tear on it being the gun-metal tips of the four blades, and then it is only their own weight *plus* the centrifugal force that rubs on the case. The use of ball-bearings prevents the rotar dropping in the case, and thus causing uneven wear on the surface of it.




**Arrangement of Pressure-Raising Plant for Dalkeith Palace.**

Beside the usual inlet and outlet valves, there is an automatic bye-pass valve and a relief valve or governor. The relief valve consists of an ordinary safety valve made gas-tight on the spindle by means of a diaphragm, and which allows the excess gas to pass back to the low-pressure side. The valve works in a dash-pot in order to prevent any fluctuation of pressure. It is also capable of having the pressure adjusted while the plant is running. The automatic bye-pass valve is on the principle of Milne's constant-pressure governors, and shuts as soon as the pressure on the outlet rises above that for which the valve is set. This pressure is kept a few tenths above the ordinary pressure at the inlet, so that when the plant stops there may be no dropping of pressure on the high-pressure main below that of the inlet. There is also a fast-and-loose pulley on the compressor, so that it may be off and the exhauster running. There is no fluctuation on either the inlet or the outlet. During the past winter, it was running continuously for three months, and gave the utmost satisfaction.

### Discussion.

Mr. A. C. Young (Arbroath) was glad the President had mentioned their old friend Mr. Bell, of Dalkeith, who, on more than one occasion, filled the chair of the Association at practically a moment's notice. There were a great many interesting points in the address—such as the reference to the Association being a very old one. It was much larger now than it was when he joined it, about fifteen years ago. The President had drawn attention to the fact that in the past it was considered that profits were entirely made in the retort-house, but now it was realized that profits were made elsewhere. Undoubtedly, they had come to see that pushing for custom and satisfying consumers were the lines to go upon; and they might even go still farther. He believed it would be a good thing to send out lady visitors to consult with housewives, and to help them in any difficulty they might have with gas-cookers. There was much to be learned in the matter of cooking with a gas-stove. The Publicity Committee had been before gas companies and corporations lately; and a difficulty had been felt as regarded the 2s. 6d. per million feet which had been mentioned as a suitable sum to contribute. In Arbroath, they had ultimately fixed upon 1s. 6d. per million. It was not easy to get corporations to see that it was a necessary thing to advertise a gas-works; and he thought they had done quite well in beginning with 1s. 6d. But 2s. 6d. per million was really a small sum. The President had spoken of wet meters and high pressure. They once had a disagreeable experience in this connection. Their gasholder was weighted to 6 inches; and they accidentally one day bye-passed to the whole of the town, and blew the water out of several wet meters. In the case of one of the meters, the gas which escaped filled the room, and nearly suffocated a man. The question arose then as to who was responsible for the damage; and the Corporation paid a nominal sum. On account of the high pressures, they would have to give up wet meters, unless they could get them to stand a pressure of more than 5 or 6 inches. He had seen practically all the modern systems of carbonizing which were to be found; and he must say that, for sweetness, cleanliness, and ease in working, the vertical retort was to be the retort of the future. He did not know why it should not be even the retort for small works. He was glad to be able to say that the installation he saw in Glasgow was before anything which he had found outside Scotland. He was much interested in the samples from the hydraulic main shown by the President; and he would like to hear from him how he proved that the substance was ammonium chloride. He had no idea that there was such an amount of fixed salt in gas.

Mr. A. B. Scott (Cowdenbeath) expressed the opinion that anyone attending the Waverley Association meetings could scarcely do so without thinking of the older Associations of the gas profession. There was certainly a great difference in the management of gas-works, even of the very smallest works, nowadays, compared with what was the case in the early days of the Association. The President added to the old phrase that "profits are made in the retort-house," that they are "maintained in the consumers' houses." He looked at the matter somewhat in this light—that if they managed a gas-works for the making of residuals, the profit would be made in the gas-works; but if they managed them for the making of gas, then the profits were made in the consumers' residences. They knew of at least one case in which it paid to carbonize coal for the residuals. It did not matter very much whether they sold gas or not. So it was a matter of circumstances. There was no question about it. In the smallest-sized works, if they could get a good price for gas, it paid to make gas; but if they got a better price for residuals than for gas, then it paid to make residuals. If gas could be made without damaging the production of residuals, then so much the better; but he was afraid that it was the case that in most well-managed gas-works, if they wanted to increase sales of residual products they had to do with less gas, and if they wanted to increase their make of gas per ton of coal, they would find that their residuals were suffering. They could not have it both ways. Certain new ideas had been introduced, as, for instance, to take 500 or 600 cubic feet more gas out of coal; there were appliances such as retort-house governors and Meunier's hydraulic main floats, which he mentioned at the Informal Meeting, by which an increase of gas could be obtained without damaging the residuals. If, in Fife, they got 20 lbs. of sulphate of ammonia per ton of coal, they considered they were doing fairly well. But in the west country they talked about 30 or 40 lbs. per ton of coal. They had heard it stated that there were 80 or 90 lbs. in coal; but the question was how it was to be got out. If they could get this quantity, they might be able to give away gas. There was no doubt that profits were maintained in the consumers' houses, and that attention to consumers had a great deal to do with it. He stated at the April meeting that they expended about 1½d. per 1000 cubic feet of gas sold in doing work for which they got nothing. He found that it really exceeded this. It was not quite 2d., but it was over 1½d.; and he was confident that it paid them to do this work. If they did not do it, they certainly would not sell so much gas; and then, of course, their profits would go down. Attention to consumers had had a great deal to do with the success which the gas industry had achieved in recent years; but he sometimes thought they were perhaps a little inclined to boast of the success of the gas industry, as if it were a result of their own labours and ideas, while possibly the men who preceded them had had more to do with it than present-day gas managers. He was inclined to think that the men of former days laid the keel, and that they of the present day were only building up the ship. The President mentioned having trouble in the working of wet meters with high pressure. He thought it was a mistake for any gas undertaking not to supply their own meters. If they supplied them, they could gradually have dry meters substituted for wet ones; and he thought they were all agreed that the day of the wet meter was past. They were all interested in vertical retorts. There was no doubt that these were going to play an important part in the future, even in very small gas-works, where they would never think of adopting anything in the way of machinery. He had the pleasure of seeing in course of erection an installation of vertical retorts in which they could work as low as two retorts, which were equal to eight of the ordinary kind. The members would realize that this came within the reach of very small gas-works; and he had no doubt that before many years had passed they would be taking up the question of introducing vertical retorts into such works. He did not know that the results of working with them, as against the good results which had been obtained with inclines and horizontals with machinery, were so much better as to encourage anyone to throw out a bench and put up verticals. The labour saving was certainly a great point; and if anyone had trouble with men going on strike, or the like, there was no question that being able to do without stokers would be a certain benefit. He was afraid he could not say much about the President's experience with the obstruction in the hydraulic main. He had never had any such thing. He did not know that the President had ascertained what really was the cause of the trouble, though he had possibly found the cure. If it was a case of there being a large body of fixed ammonia in the gas getting among the tar, he did not think this would affect him, because there was very little fixed ammonia in the gas at Cowdenbeath. He considered the

President's method of dealing with the difficulty of supplying gas to Dalkeith Palace was the right one. Where trouble cropped up in the shape of lack of pressure, pumping the gas was the cheapest and best mode of getting out of the difficulty. Anyone who had put in high-pressure plant, and realized the command it gave him over pressure, would never do without it. It made him absolutely master of the situation. The table showing the consumption of gas at the palace was one more proof of the advantages of good pressure, and the adoption of the incandescent burner. While there might have been a loss in the sale of gas, this just meant that the people had more money to pay for gas which they would burn in some other way. He had always thought it better rather to increase the size of the plant, and to have it running at a lower speed, than to run it at the speed mentioned by the President. The higher the speed at which they ran the plant, the quicker it would come to an end. He had always been disposed to recommend steam-engines for use in gas-works, because they had a command with steam-engines which they could not very well get with gas-engines.

The PRESIDENT explained that he found out, from two authorities, that the substance in the hydraulic main was ammonium chloride.

Mr. J. M'LEOD (Greenock) said he had listened to the address with great interest. The deposit which was found in the hydraulic main was interesting. When ammonium chloride was mentioned, he was a little astonished, because he would have considered ammonium carbonate as much more likely. But it was evident that it was ammonium chloride. It did not smell strongly, as ammonium carbonate would—and, of course, it had been verified by experts. He did not know how ammonium chloride could get there in such quantities. If coal had been in contact with sea-water the percentage of chlorides might be higher than in the case of coal which had not; but this was simply a suggestion. He was much interested in the account of the gas supply to Dalkeith Palace, and would like to congratulate the President on his using a gas-engine. He thought they were at fault in not using gas-engines more in their gas-works. A large percentage of them, he believed, did not have such a thing as a gas-engine inside their works. They should make an effort, if possible, to use gas-engines. It was not an easy matter to push the use of gas-engines, if the people with whom they were dealing were able to say to them that they did not use one themselves. In Greenock, the number of gas-engines had come down from 114 a year ago to about 106. Electric motors had displaced them to this extent; but he thought they were getting back to where they were. Of course, for ship-building purposes, the electric motor afforded facilities which the gas-engine did not; but the use of gas for annealing purposes was extending. They were getting a great deal of business in this way, more particularly from the torpedo factory, where they asked for a 6-inch main to supply them with gas for annealing plates, and other purposes. He strongly agreed that profits were maintained in the consumers' premises. They had had to change their methods completely. It was no longer possible for a gas manager to sit at the receipt of custom, and see the money flowing in. He had to go out and seek for it. He had had two exhibitions, both of which had been very successful. They had received orders for 300 gas-cookers, although no exhibition had been held since September last.

Mr. T. BLACK (Coldstream) said the part of the address which had interested him had been that pertaining to the high-pressure plant. It was doubly interesting to him, because he was in much the same position as the President. He had a large consumer, in the Earl of Home, at the Hirsel, the supply to which was taken off at the extreme end of a 4-inch main which ran along the High Street. When he went to Coldstream, one of the first questions the Directors asked him was as to what could be done to improve the supply of gas to the Hirsel. For years there had been complaint that they could not get sufficient gas. They had, in all, somewhere about 30 meters taking gas through a large meter. There were large cooking ranges; and when these were in full operation, the supply of gas was very defective. Last October, he put in practically a duplicate of what the President had described; and the result had been that the Hirsel now had an ample supply of gas everywhere. They were able to maintain more than double the pressure they could do formerly; and they had expressions of satisfaction where previously they had nothing but complaints. They differed from the President in that, instead of decreasing, the consumption of gas at the Hirsel had increased to a great extent. For the four months ending April 30, the consumption had gone up about 80,000 cubic feet. The annual consumption at the Hirsel was about 1½ million cubic feet. This was a consumer that a small concern like the Coldstream Gas Company could ill afford to lose.

Mr. H. O'CONNOR (Edinburgh) said the President spoke of constant pressure. Constant pressure alone was, of course, a most excellent thing; but they wanted everything about a gas-works to be constant, too. They wanted the quality to be constant, as also the heat value, the mixture of the various gases which went to form what they called coal gas, the quantity of hydrogen, of marsh gas, and of carbon monoxide. All these must be constant and equal in quantity from day to day. Each of these gases required a certain quantity of air for their proper combustion. With marsh gas, they needed four times the quantity of air which they did with others. If they had an inverted burner regulated to a gas containing (say) 20 per cent. of marsh gas, and they increased the marsh gas to 30 per cent., they would upset the whole of the arrangements which had been made in the burner for proper combustion, because they would require a much larger quantity of air. This was where the advantage came in of having a constant supply. Constancy was a most important matter for them in gas-works. It was not good to get a high pressure one moment and a low pressure another. They must maintain the pressure constant, as well as the other matters he had set forth. As regarded the salt the President found in the hydraulic main, Mr. M'Leod had mentioned one possible cause for the formation of ammonium chloride. He was going to ask whether the President had been trying an invention which he, along with Dr. Drinkwater, brought out, in which, by putting salt on the coal before it was put into the retorts, they removed arsenic from the coke. If he had, he could imagine his getting ammonium chloride in the hydraulic main. He had not heard of anyone using this patent; but, of course, the employment of salt would be a probable cause of the chloride combining with the ammonia. With reference to the compressor which the President had been using, he had a little experience of a similar one, on a small scale. He had put up in Edinburgh a large drill hall, and had lighted it with incandescent gas at high pressure. He had put in a compressor, driven by a ½ H. P. electric motor, using current from the town mains, capable of passing 250 cubic feet per hour, at about 60 inches pressure. There were 16 burners, of nominally 500-candle power each. The plant could be seen by anyone who cared to go down to Easter Road. Mr. Scott had referred to the high speed of the compressor. In the old days, they heard a good deal of the troubles that high-speed machinery would cause. The question cropped up largely when the dynamo was introduced; but they found dynamos running now for a long time without trouble—and their speed, of course, was very high. They found also, with regard to motor-cars, which were at present troubled by the extreme weight of the engine, that they had been able to cut this down by the increase of the speed; and the power of the engine had been largely increased. There, again, they found there was not much difficulty as regarded the wearing capabilities of the high-speed engine. He thought the most important thing they had to do in regard to gas supply was to educate the public. All the apparatus which was being made for lighting and heating was of a much more scientific nature than it used to be; and it required that they should educate the public who had to employ the apparatus, so that they should know how to make the best use of it, and get the best results from the gas which was being made in the various works. Before they could educate the public, they must educate themselves. The peculiarities of all the modern pieces of lighting and heating apparatus were based upon scientific facts; and it was necessary that these facts should be understood, and that the method of applying them should be thoroughly grounded in everybody who had to deal with the apparatus, or to use it.

The PRESIDENT thanked the members for the patient hearing which they had given him, and for the interesting discussion. At one time, he was not sure whether he should mention the little experience he had with the hydraulic main; but then he thought it might encourage some others to voice any trouble they might have, if he mentioned his difficulty. The salt was a tremendous surprise to him. His expectation was to find the main pitched; and he took the usual methods to try to clear it. But it simply would not clear. There was nothing for it but to take the cover off; and when the cover was off, he was much surprised to find this substance, 7 or 8 inches thick, from about 1½ inches below the dip-pipe to the bottom of the main—crystals and tar intermixed. He thought at first it was ammonium chloride, and he telegraphed to Mr. Bisset, the Chief Chemist at Granton. Mr. Bisset said it would be ammonium chloride, and told him to mix with lime, and see if a strong ammonia smell would come off. He did so, and got the smell. He sent a sample of the staff to Mr. Bisset; and he reported that from the formation of the crystals one could see that it was ammonium chloride. He also sent a sample to Mr. Napier, of Alloa, not telling him the information which he had obtained from Mr. Bisset; and what Mr. Napier said quite confirmed everything Mr. Bisset had said. Mr. Napier stated that it must have been an accumulation of years. It might have been in the main last year, when the pipe was run down, as it always was in the summer time. It was run down last year; but whether the crystals remained in it, he did not know. How it came to be formed, he could not tell. They had not been trying experiments with salt, such as Mr. O'Connor suggested. One gentleman to whom he mentioned the matter thought it might have come from the salt glaze upon the inside of the retorts. Mr. Scott spoke of the speed of the compressing plant. Mr. O'Connor referred to the same subject, and, he thought, quite answered Mr. Scott. He was pleased to learn that Mr. Black's experience with an increase of pressure at the Hirsel did not act in the same way as the increase at Dalkeith, in that he had had an increased consumption. If he himself had not put in this compressor and given a better light, his decrease would have been much larger, because they would probably have lost the consumer altogether. Mr. O'Connor spoke of its being desirable to have a constant composition of coal gas. This would be a difficult matter to accomplish, especially in small works, where they had not a retort-house governor, for instance, and the vacuum varied with the make of gas. In weather like they were then having, the strong sunshine sent the holder up; and before they knew, the tails of the retorts were away into the holder. It was very difficult indeed to keep the quality of the gas up without a retort-house governor. He had had to get quite a number of meters replaced, for the simple

reason that the difference in water-level when the gas was burning and when it was off appeared to be so great that the float stopped and shut off the gas; and this difference in water-level also allowed the valve to shut with an increase of from 20-10ths to 30-10ths. They were all agreed that the day had come when they must educate the public; and they were looking forward to the Publicity Scheme helping them in this way. No publicity scheme however, could do the work which persuading in their own individual towns could do. Individual attention to the several complaints of consumers, he thought, went very much further than all the advertising which they might do.

ELECTION OF OFFICE-BEARERS.

Office-bearers for the year were elected as follows:—

*President.*—Mr. Jas. Hamilton, of Tranent.

*Hon. Secretary and Treasurer.*—Mr. Cuthbert Hamilton, of Loanhead.

*Members of Committee.*—Messrs. A. Bishop, of Newton Grange; T. Black, of Coldstream; J. Macmillan, of Lasswade; and P. Blair, of Haddington.

The members and friends dined together in the hotel, and afterwards went by train to Queensferry, where they were permitted to walk across the Forth Bridge. The weather was of the best; and the excursion was much enjoyed.

## THE ARRANGEMENT OF SHOW-ROOMS.

By A. V. COOPER.

WHEN the enormous amount of money that is yearly expended in gas by the public throughout the country is considered, the arrangements, generally speaking, for the exhibition of fittings and apparatus are inadequate. As a means of improvement, is not some classification necessary?

A scheme which is adopted by all the modern furnishers might be used to a modified extent by many gas companies having a fittings show-room. For instance, a purchaser who is desirous of selecting a drawing-room suite is not shown into a room in which there is displayed a miscellaneous assortment of furniture. He does not choose a settee that is rubbing shoulders on the one side with a Windsor chair and on the other with a deal-topped table. On the contrary, he is shown into a room, or a number of rooms, specially reserved for the class of furniture he requires. If kitchen appointments are needed, he is taken into a specimen kitchen.

A comparison of the arrangements made by many of the gas companies may here be appropriate. There is probably a single show-room in which are found all kinds of fittings; and cooking and heating stoves may occupy much of the floor space. Suppose drawing-room fittings are required, the necessary articles have often to be selected from among outside lamps and shop-fittings; and if a cooking-stove has to be chosen, a number of disconnected stoves are shown. But to see them connected, as in use, is an opportunity not always given.

It will be admitted that the object of a show-room is not only for the sale of fittings, but for something of greater importance—viz., to popularize the use of gas for the various purposes of the home and elsewhere. Therefore, should not the management see that consumers have the fittings and appliances properly shown to them, and advice given to them as to the right methods of obtaining satisfactory results? This can best be accomplished by demonstrations in properly equipped apartments. For these reasons, it is desirable that a number of separate rooms be used. Some suggestions for their arrangement follow.

1.—A room suitably decorated and furnished to be used for showing fittings of a good class. A number of cases would be required for displaying brackets (disconnected), globes, and silk shades. The room could be heated by one or more heating stoves, fixed in the fire-place or fire-places. Pendants, brackets, and both standard and table lights to be fixed for lighting purposes, and as a means of giving consumers a better idea of the appearance of the fittings in use.

2.—A well-ventilated room, to be used as a kitchen, fitted with a sink, over which a geyser could be fixed. To one of the pendants provided with a connection for flexible tube, gas-irons could be attached; and to nozzles fixed in various places, grillers might be connected. A specimen of each make of cooker on sale should be fixed for demonstration; and in order to complete the classification, all cookers and cooking apparatus, whether connected or not, should be shown in this room.

3.—A room to be reserved for heating stoves and heating apparatus, with working examples. Though there would be heating-stoves in use elsewhere, the fact that disconnected stoves shown in other rooms would mar the various effects, should be a sufficient reason for having a separate room. A test meter, with necessary connections, would be found of service for trials of stove consumptions.

4.—A room fitted with a bath and lavatory basin, for showing in use water-heaters of various kinds.

5.—A room arranged for exhibiting workshop appliances, disconnected and in use. A rail supplied from a test meter would here be convenient and appropriate for showing burners (incandescent, &c.), and for testing their consumptions. The room could be illuminated by outside lamps and fittings suitable for shops and factories. Disconnected fittings of this character could also be shown.

The adoption of this arrangement should increase the general sales. It would be appreciated by consumers, and help to sustain, in matters relative to the use of gas, the interest which of late years has greatly increased—a fact well known to those whose work brings them into contact with the public.

### Heating and Ventilating Congress at Dresden.

The eighth annual meeting of the German Heating and Ventilating Engineers is being held in Dresden this week. The papers to be read include the following:—

"The Relation of Modern Heating and Ventilating Science to Hygiene," by Professor Pfützner, of Carlsruhe.

"The Old Style of Central Heating Installations," by Herr H. Vetter, of Berlin.

"The Heating and Ventilation of Schools," by Herr H. Schumacher, of Berlin.

"The Heating of Water for Domestic Purposes," by Herr W. Vocke, of Dresden.

Reports will also be presented by Herr Wahl, on "The International Exhibition of Hygiene;" by Dr. Brabbée, Professor at Charlottenberg, on "The Scientific Section of the Ventilation and Heating Branch of the International Exhibition of Hygiene;" and by Herr Recknagel, of Berlin, on "The Collective Exhibit of the Association of German Central Heating Engineers."

### General Meeting of the Association of German Engineers.

The fifty-second annual general meeting of the Association of German Engineers is being held at Breslau this week. The technical proceedings will be transacted under the presidency of Herr Kurt Sorge (Messrs. Fried. Krupp and Co.). Lectures will be given, *inter alia*, as follows:—

By Herr D. Meyer, of Berlin, on "The Development and Aims of Instruction at German High Schools and Technical Colleges."

By Herr C. Matschoss, of Berlin, on "The Historical Study of the Relations between the State and Technology."

By Dr. Oebbeke, Professor at Munich, on "The Occurrence, Nature, and Economical Importance of Petroleum."

By Dr. Nägel, Professor at Dresden, on "The Modern Development of the Stationary Oil-Engine."

By Dr. Bonikowsky, of Cattowitz, on "The Economical Aspects of the Upper Silesian Mining Industry."

Among the works which will be open to the inspection of members attending the meeting are the Municipal Gas-Works of Breslau, at Dürrgoy, which will be visited by one group to-day (Tuesday), and by another group to-morrow (Wednesday) afternoon.

### Répertoire des Industries Gaz et Electricité.

We have received a copy of the above-named work for the current year. It first appeared in 1893; and each succeeding year the contents, which occupy 770 pages (4½ in. by 7 in.), have undergone revision so as to make the book of the greatest possible value to all who are interested, either technically or commercially, in the two industries with which it deals. Commercial firms desirous of coming into direct touch with customers will find, in addition to the list of gas-works and central electricity stations in France, arranged in alphabetical order, the names of gas and electric light fitters in the towns in which the illuminants named are in use; while managers of gas-works and electric light stations will find a full list of makers of the various appliances required by them. Details are given of the capacity and system of working of electric light stations. Each of the two divisions of the book embraces a special chapter containing the names of the principal gas and electric light companies, with the amount of the capital, the address, the names of the directors, and the number of works under control. The book has been produced under the supervision of M. Maurice Germain, the Editor of the "Journal de l'Eclairage au Gaz et à l'Electricité," from the office of which publication (No. 7, Rue Geoffroy-Marie, Paris) the book is issued, at the price of 4 frs. 15 c. for places outside France.

**Canadian Gas Association.**—The fourth annual meeting of this Association is being held in Quebec this Thursday to Saturday, under the presidency of Mr. Arthur Hewitt, General Manager of the Consumers' Gas Company of Toronto. The mornings will be devoted to routine business and the reading of papers; and the afternoons will be left open for trips round the city, to the famous shrine of St. Anne de Beaupre (stopping on the return at Montmorency Falls), and for sight-seeing generally. On the evening of the second day, there will be a ball for members and their ladies, at the invitation of the Quebec Railway, Light, Heat, and Power Company, conveyed through their General Manager (Mr. C. E. A. Carr). It will take place in the beautiful ball-room of Kent House, the residence of the Duke of Kent (the father of the late Queen) when he was Commander-in-Chief in Canada.

# MANCHESTER DISTRICT JUNIOR ASSOCIATION.

### Meeting at Blackpool.

In arranging for the summer meeting to be held at Blackpool, the Council of the Manchester and District Junior Gas Association had in view the fact that members would have an opportunity, through the courtesy of the Gas Engineer (Mr. John Chew) and the Deputy-Engineer (Mr. W. Chew), of seeing some interesting alterations and extensions now in progress at the gas-works. Had the visit been postponed to a later date, the members would have been able to inspect a combination of carbonizing systems not usually found in operation at one works. However, the extensions and alterations are in a forward state; and the visit, which took place last Saturday week, proved an interesting and instructive one. The party, headed by the President (Mr. A. L. Holton), were welcomed at the gas-works by Mr. John Chew and Mr. W. Chew, and partook of refreshments prior to the inspection. Mr. Chew, senior, recalled, in the course of conversation, his early experiences at the Blackpool Gas-Works, which have, under his charge, developed from a 10 million cubic feet plant to a duplicate set of works with a combined output of 569 million cubic feet a year. He mentioned, in answer to questions, that when he went to Blackpool in 1862 (after a service of ten years at the Bradford Road Gas-Works in Manchester) the gas-works in the town were owned by a small Syndicate, and did not pay. Long before the Corporation acquired the undertaking—that was, in 1869—the works, under Mr. Chew's management, had been converted from a losing concern into a paying one. Incidentally, Mr. Chew contrasted the position of the gas stoker fifty years ago with that of to-day. When he went to Blackpool, the stokers received a guinea a week; and worked twelve-hour shifts; while now they have eight-hour shifts and two guineas a week, with eight days' holiday each year and pay. One gathered, too, that by judicious management the summer day load has increased very rapidly—due in a great measure to the cultivation of the use of grillers, which are supplied free to the consumers, who number over 15,000. Users of gas who want cookers have to buy their own. Commercially the gas undertaking has been very successful; gas being sold at 2s. 2d. per 1000 cubic feet to ordinary consumers, and 1s. 10d. for power purposes. The gross profits are equal to 12 per cent. on the capital outlay; the rates benefiting to the extent of one-half the profits, and the balance being absorbed by interest, sinking fund, and depreciation. An interesting item of information supplied was that the leakage account, which originally amounted to 35 per cent., has for many years been reduced to 2½ per cent.; a record being achieved last year, when it was 1⅛ per cent. Of the 569 million cubic feet of gas made, 560 millions were accounted for.

At the conclusion of the repast, the visitors divided up into parties, and proceeded to an inspection of the works, under the direction of Mr. W. Chew, Mr. J. H. Chew (Station Engineer and Chemist), and Mr. F. Lees (the Chief Clerk). Mr. James Bailey, the Vice-Chairman of the Gas Committee, joined the company, and extended, on behalf of his colleagues, a hearty welcome to the visitors. For manufacturing purposes there are two separate stations, known as the West and East Side; the former being the outcome of many extensions, until, in the year 1900, owing to the increased consumption, it was found necessary to erect a new plant on the East Side station, the old site having become too small. The stations are in every way complete for their purpose, having separate sidings. Most of the plant is under cover; being thus protected from summer sun and winter storms.

What is called the West Side station was first inspected; and it was an object-lesson for many to see how parts of the original works had been blended with the subsequent extensions and utilized for modern requirements. The miniature retort-house, with its few settings, which did duty fifty years ago, still stands, and, cleared of the old plant, is used for the storage of lime. Near is the old purifying-house, part of which now serves as a chemical laboratory. A paved and well-kept quadrangle forms the central area of these works, flanked on three of its sides by the purifying, retort, and sulphate houses, and on the fourth by two telescopic holders; the centre being occupied by the governor house. In the retort-houses hand charging still obtains; the coal-waggons being run right into the buildings, so that there is only a short distance for the fuel to be conveyed to the retorts—a method which, said Mr. W. Chew, is found to be very economical. What the Deputy-Engineer claimed to be a new tar process much interested the visitors. The tar is pumped from a well through the hydraulic mains and kept circulating; the object, of course, being to free the mains of any pitchy matter by reason of the constant flow.

There is in course of erection a retort-charging and drawing machine by Messrs. Robert Dempster and Sons, of Elland; and a coal-breaker is being put in, as well as other improvements carried out, for the purpose of bringing the older plant up to modern requirements.

The East Side works are arranged in plan with a main avenue 50 feet wide; one side being taken up with the retort-house, and the other by the purifying-house, meter-house, and general engineering workshops, with a large three-lift telescopic gasholder in the rear. The general carbonization is carried out on two systems—the horizontal and semi-vertical, with generator and regenerator settings throughout. The former has up-to-date mechanical arrangements for handling coal and loading coke, while the latter is fitted with overhead coal storage, elevators, and hot-coke conveyors to the coke-hoppers. An effective arrangement of tar-towers, anti-dips, water-sprays, and retort-governors is in use. In the retort-house were to be seen side by side different types of settings; Mr. Chew explaining that experiments were being made to find out which gave the best results. The water-sprays in use to prevent choking-up of the ascension-pipes formed a particular feature of interest.

The plant at the East Side station includes a considerable run of large steel receiving and condensing mains, fitted with baffle chambers for naphthalene extraction. Two batteries of annular condensers, 40 feet high, in sections, rotary exhausters, Pelouze and Audouin extractors, tower scrubbers, and rotary washers complete the ammonia and preliminary purification; and the gas is finally treated with oxide of iron and lime in purifiers of the luteless type, some of which are of a size of 50 feet by 35 feet. The ammoniacal liquor is worked up into sulphate with a chemical plant on the continuous system, capable of turning out 4 tons of salt per day; the yield of salt being 27 lbs. per ton of coal. The several blocks of buildings also contain four Lancashire boilers, pumping appliances, mortar mill, power plant, exhausters, workmen's dining-room, bath-room, and lamp repairing workshops. There is a separate entrance to the East Side works, with departmental offices for dealing with the sale of residuals, coal supplies, and general goods. The two works are connected by a subway under the Lancashire and Yorkshire Railway Company's lines.

When the inspection had been finished, the party assembled in the chemical laboratory, where a meeting was held, under the presidency of Mr. Holton.

In moving a vote of thanks to Mr. J. Chew, Mr. W. Chew, and Mr. J. H. Chew, for having afforded facilities to view the works, and for the hospitality extended, Mr. W. L. Heald remarked that the visit had been made all the more interesting because of the fact that they had been able to see different systems in operation. It was not often they had the opportunity of inspecting such a combination as had been the case that day; and they were all much indebted to Mr. Chew and his son. They had seen there was no lack of initiative at the Blackpool Gas-Works, and that care was taken to keep the undertaking on a sound basis.

Mr. H. H. Mercer (Widnes) seconded. The visit and inspection of the works, he said, had proved interesting and instructive. Several new features had been seen—to some of them, at any rate—and he thought the time had been well spent. Mr. Chew and his son were to be congratulated upon being able to sell gas at the price they did; and this no doubt was greatly due to the care taken with regard to capital outlay.

The President, in putting the resolution, which was carried with applause, said it seldom happened that they found grandfather, son, and grandson all actively engaged in the management of a gas-works at the same time, as was the case at Blackpool; and it was a fact upon which the members of the Chew family were to be congratulated. That Mr. Chew, senior, had seen the gas-works grow from small beginnings to their present dimensions, must be to him a matter of pardonable pride and satisfaction.

In responding, Mr. J. Chew said he was what they might call "one of the old gas-men." He proceeded to give those present—the young gas-men—a little advice. In his long service with gas manufacturing, he had made the business the hobby of his life, just as a man should do in any other business, if success was to be gained. To the young gas engineers he said: "Learn all you can about the business. Avail yourselves of all the knowledge you can get, and make yourselves as proficient as possible." He said this particularly because they had a formidable competitor and opponent in electricity, which, as they knew, was sometimes sold below its prime cost. It was his opinion, however, that they had nothing to fear from it, and could hold their own with gas by keeping themselves up-to-date. After relating what had been done with electricity in Blackpool, he said that, despite the competition, they were selling more gas in the town now than ever; their day-load being much heavier than the night-load. In conclusion, he expressed the hope that the members would profit by these visits, and warned them not to imagine at any time they had nothing more to learn, because when such an idea was formed there could be no progress.

Mr. W. Chew also responded, and remarked that, having had the handling, practically, of the whole work entailed in the modernization of the plant, it had been a pleasure to him to show members over the place. They had seen the small economies which had been effected, and what had been done to bring the works up to modern requirements. They had now a great competitor in electricity; and it was necessary they should keep an eye on capital account. He remembered many years ago, when the electric light was introduced, his father pointed out, at a meeting of the Gas Institution, the desirability of those in charge of gas undertakings looking to their capital account. At Blackpool, no outlay was entered upon without very careful consideration; and he thought their capital account was reasonable. In carrying out alterations and extensions, there had been no waste—no needless pulling down of buildings; and use had been made of the old structures, as they had seen that day. Referring to the leakage account, Mr. Chew said it was perhaps rather startling to some of them to hear that it had been reduced from 35 to 1½ per

cent. This satisfactory state of things he attributed to their having lead pipes and two sets of mains, one on each side of the street. Salt water was found to affect wrought-iron pipes; but it was not without difficulty they had their way and were able to put down lead pipes. This, coupled with the two sets of mains, had proved most effective.

This concluded the proceedings at the works; but a number of the party went out to the Gynn, to inspect the Booster depôt there. To supply an out-district two miles away from the works, a gas-driven booster has been fixed at the rear of the Gynn Inn, which accelerates the delivery thereto during peak-loads.

## OTTO-HILGENSTOCK BYE-PRODUCT PROCESS.

At the recent Meeting of the Institution of Mining Engineers, a paper on "The Otto-Hilgenstock Direct-Recovery Process and its Application" was submitted by Mr. Ernest Bury.

In introducing his subject, the author remarked that of late years there had been a general movement on the part of mining men and engineers in the direction of substituting for the old-fashioned beehive system the modern bye-product retort-oven process. This movement had been so marked that the complete predominance of the process named now appeared to be imminent in this country. Until recently, the constructors of modern coke-oven installations contented themselves with basing the design of their bye-product recovery plants on that employed by gas-works throughout the country. But within the last five years or so drastic improvements had been effected; several firms having pursued new lines for themselves. Of those brought to a successful issue, he considered the process he was about to describe was of the most immediate importance. He then gave the following particulars of

### The Otto-Hilgenstock Process.

Briefly, the process consists in extracting the tar from the hot moist gas above the dew-point—that is, the temperature at which steam begins to condense from the gas—and then forcing the purified gas straight through sulphuric acid, where the ammonia combines with the acid and forms solid sulphate. On emerging from the acid bath, the hot gas returns to the ovens, or other points of consumption, still containing all its moisture in the form of vapour. This method of direct recovery dispenses with the use of water and water-coolers, ammonia scrubbers, lime and lime-mixers, ammoniacal liquor stills, and waste-liquor settling-tanks. It reduces the loss of ammonia to a minimum, and effects considerable economy in space, working expenses, steam consumption, labour, &c., besides avoiding completely the production of all or any deleterious effluent which has been, and still is, a source of trouble to both sulphate makers and their neighbours.

The Otto-Hilgenstock process has opened up many new and interesting problems connected with the interactions of gases, vapours, liquids, and solids, and their resulting equilibria in the saturator. The writer would refer those who are interested in this question to a paper by Herr O. Rau, communicated to the International Congress of Mining, Metallurgy, Applied Mechanics, and Practical Geology, held at Düsseldorf in June, 1910, in which some valuable data and diagrams on the subject are submitted. The quality of the sulphate is thoroughly good, as shown by the following analysis:—

| | Ammonia. ($NH_3$.) Per Cent. | Free Acid. Per Cent. | Nitrous Oxide. ($N_2O$.) Per Cent. | Organic Matter. Per Cent. |
|---|---|---|---|---|
| Sulphate from Carnock (average sample) | 25·10 | 0·48 | 1·7 | 0·03 |
| ,, New Brancepeth ,, | 25·10 | 0·42 | 1·5 | 0·02 |

The colour is a good grey, and in some cases almost white.

As the whole bye-product plant consists merely of tar-sprayers, exhausters, and saturators, the installation can be made very compact. For instance, the ground space occupied by the plant at the Carnock Colliery, where two complete sets of sprayers, exhausters, and saturators are laid out, each capable of dealing with the hot gases from 50 ovens, comprises only 2000 square feet, and is situated under one roof; thus reducing the labour costs to a minimum. By dispensing with the stills, the saving of steam becomes a considerable item. The steam consumption on the Otto direct-recovery plants at Carnock and New Brancepeth is only between 1 and 2 tons per ton of sulphate respectively, whereas at least 8 tons is required by the indirect process. There can be little doubt that by a simple arrangement no steam at all need be consumed in operating the direct-recovery plant. Again, by the abolition of both coolers and scrubbers, the necessity for water is dispensed with.

The following figures of practical results, from Messrs. Cochrane and Co.'s New Brancepeth installation, have been obtained by the writer through the courtesy of the General Manager (Mr. Robert Peel): The gas pressure in the hydraulic main averages 0·2 inch of water-gauge, the suction on the main before the tar-sprays is equal to 1 inch of water-gauge, and before the exhauster 4 inches of water-gauge. The pressure between the exhauster and the saturator is equal to 23 inches of water-gauge; and after the saturators, 4 inches of water-gauge. The average temperatures (in degrees Centigrade) are as follows: Hydraulic main, 225; before tar-spray, 86; after tar-spray, 58; after exhauster, 66; in saturator, 67; after saturator, 58. Mr. Peel states that the ammonia in the return gas never exceeds 10 grammes per 100 cubic metres; and as there is no waste liquor, there is no loss in this way, as in the old method.

The working of the plant is simple and economical; and as the losses incidental to the production of ammoniacal liquor and the conversion of ammonia before the saturator are obviated, the yield of sulphate of ammonia is augmented to this extent. So far as can be judged from the short experience at New Brancepeth, this will amount to at least 5 per cent. The sulphate of ammonia analyzes, on an average, as under: Ammonia, 25·2 per cent.; moisture, 1 to 2 per cent.; free acid, 0·44 per cent.

Dealing next with the subject of the avoidance of waste liquor and deleterious effluent, the author showed that the Otto-Hilgenstock Company had demonstrated successfully how the serious effluent trouble could be completely overcome at a profit to the sulphate makers. He then passed on to consider the question of the supply of

### Coke-Oven Gas for Town Lighting.

Recently developed interest in the supply of coke-oven gas for purposes of town lighting has brought forth some comment on the application of the "Otto" direct-recovery process in this direction. It has been suggested, for instance, that by the passage of the gas through hot sulphuric acid in the recovery of sulphate, the illuminating and calorific value of the gas would suffer through loss of the heavy hydrocarbons. The writer examined this point at Auchengeich, and found the calorific value of the gas on several days' tests to range as follows: 596, 602, 599, 608, and 581 B.Th.U. per cubic foot. These figures are comparable with those of present-day town gas.

The writer recently had the privilege of inspecting the Hanover III. "Otto" plant, working on the direct-recovery process, which is supplying the town of Bochum with illuminating gas. The following are the details of this installation: The plant has been working since Dec. 20, 1910, with perfectly satisfactory results. Fifty "Otto" regenerative ovens are in operation, with a capacity of 5 tons of coke per oven per day. The illuminating gas plant is at present of a size to produce 70,630 cubic feet per hour; and when the plant is extended to 100 ovens, it will be able to supply 141,260 cubic feet per hour. The total volume of gas with the full capacity of the battery amounts at present to about 3,531,500 cubic feet per 24 hours; so that, with a yield of 1,695,120 cubic feet of illuminating gas per 24 hours, 48 per cent. of the total volume of gas could be given off as illuminating gas. The highest daily supply hitherto reached with a maximum heating value of 5300 calories has been 1,341,970 cubic feet per 24 hours—that is, 38 per cent. of the volume of the total gas.

The ovens are jointed with korondin; this being the only precaution taken to ensure the gas-tightness of the oven-walls.

In order to draw off the illuminating gas separately, each ascension-pipe is provided with a second valve, connected with a special main. The separation of tar and ammonia is accomplished in the usual way by the direct-recovery process; the gas being drawn by means of a Connersville injector through the tar-spray apparatus and the saturators, and afterwards through two coolers with a cooling surface of 3225 square feet each. The gases are cooled down to 48° or 50° Fahr. The gases are further purified from naphthalene, sulphuretted hydrogen, and cyanogen. A "Standard" washer is fixed between the coolers and the exhauster for the absorption of the naphthalene. This washer is supplied with Röpert oil—an anthracene oil containing 4 per cent. of benzol; and by means of it the whole of the naphthalene is absorbed. The exhauster now forces the gas through a Pelouze apparatus, which retains the wash-oil (which has been carried along with the gases), and afterwards through three dry purifiers. These are three cast-iron boxes, 23 feet by 23 feet square and about 6 ft. 6 in. deep, fitted with three layers of wooden gratings, on which the bog-iron ore is placed. The gas goes through the individual layers of the ore, and in so doing loses, through oxidation, the sulphuretted hydrogen in the sulphur and water, and the greater part of the cyanogen through chemical combination. An iron sulphate solution washer for the quantitative removal of cyanogen is not provided. The gas, which is now sufficiently purified, goes into a gasholder of 53,000 cubic feet capacity, which equalizes the smallest variations of heating value, and at the same time acts as an intermediate holder for feeding the distance gas-exhausters.

The holder then presses the gas through a meter to the distance exhausters (Roots blowers), which press the gas through pipes 17,000 feet long, and about 10 inches in diameter, with a pressure of about 40 inches of water-gauge, to the gasholders at the gas-supply station.

The following precautions are observed:—

(1) In order to avoid exhaustion and under-pressure of the gasholder, a safety-regulator is installed between the suction and pressure pipe of the distance gas-exhauster.

(2) In order to avoid an excess of gas in the holder, a distance-valve is provided in the gas-main.

(3) To allow the gas to escape in case of the shutting-off of the gasholder, or other inadmissible rise in pressure inside the plant, a safety-pot is arranged before the dry purifier.

(4) Should the distance-main be suddenly cut off, or the pressure be inadmissibly high, an adjustable safety damper automatically opens, and connects the suction and pressure mains. At the same time, the steam-valve of the distance exhauster engine closes.

The heating value of the gas is continuously determined by a

Junkers registering calorimeter. The fluctuations in heating value are very insignificant.

The guaranteed average minimum daily heating value, calculated on 760 mm. Bar. and a temperature of 60° Fahr., must not descend below 4800 calories, and not exceed 5100 calories. This guarantee has hitherto been easily met.

At present the gas is drawn from the fifth to the fifteenth hour; and, in so doing, a maximum heating value of 5100 to 5300 calories is reached. The greatest heating value hitherto reached has been 6200 calories, with fractions from the second to the seventh hour. The lowest heating value, when using mixed gas without fractionation, amounted to 4700 calories heating value.

A guarantee for the illuminating power of the gas has not been demanded, as with incandescent lighting merely the heating value comes into question. The claims of the direct "Otto" process in the consideration of municipal gas supply may thus be said to be thoroughly established.

## ASSOCIATION OF DUTCH GAS ENGINEERS.

### Annual General Meeting.

The Thirty-Ninth General Meeting of the Association of Gas Engineers of Holland will be held at Leeuwarden from the 3rd to the 5th of July. The proceedings will open with a reception on the evening of the 3rd, and business sittings will take place on the mornings of the two following days under the presidency of Heer J. Bauduin, Manager of the Corporation Gas-Works of Maastricht. The technical business will include the presentation of reports by the Committees of the Association dealing respectively with photometry, coals, standards for the investigation of gas oils, and the archives and library of the Association. The necessary grants will be submitted to the meeting for the continuation of the work of these Committees, for the expenses of the general meeting, for those connected with "Het Gas," the official organ of the Association, for the compilation of the annual volume of statistics of the working results of Dutch Gas-Works, and for other purposes. After the election of officers for the ensuing year, the following papers will be read: "The Supply of Gas to Neighbouring Townships from Leyden," by Heer N. W. van Doesburgh, the Manager of the Leyden Gas-Works; "An Application of the Phenomenon of Diffusion, and Safety Appliances for Gas Consumers," by Heer J. Rutten, of The Hague; "Modern Coke Quenching and Conveying Plant for Gas-Works," by Heer von Hanffstengel, of Leipzig; and "A Fan (Brockway-Philips Patent) Driven by a Small Gas-Engine," by Heer J. Diephuis, of Amsterdam. A number of questions are set out in the programme on points which will be open for general discussion at the meeting. On the afternoon of the 4th, a visit will be paid to the local gas-works; and in the evening there will be a dinner, followed by a concert. On the afternoon of the 5th, there will be an excursion to Sneek, where the members will be the guests of the Gas Committee of Leeuwarden at luncheon.

### Gas at the Coronation Exhibition.

The following particulars as to the use of gas at the Coronation Exhibition have been supplied to us by the Brentford Gas Company. Owing to the alterations in the Machinery Hall, the compressing plant is unfortunately not on view to the general public this year; but the Company would be pleased to arrange for it to be seen, by appointment, by anyone interested. The grounds are lighted, as in previous years, by upwards of 300 Keith high-pressure lamps, and special high-pressure lamps have been fixed in the Scotch Village, the Maori Village, and at Bostock's "Jungle." A large number of the Indian native craftsmen, who are following their trades at the Exhibition this year, are making use of Messrs. Fletcher, Russell, and Co.'s specialities for jewellers' work, chiefly that of goldsmiths and silversmiths. A number of the firm's small furnaces with foot blowers are also in use by the artisans from Malta. The new "Cyclone" is worked by electric current, the necessary power for which is supplied by Westinghouse gas-engines; and a number of other side shows continue to be operated by gas-engines.

At their last meeting, the Gas Committee of the Manchester Corporation passed a resolution of sympathy with the widow and family of the late Alderman Briggs, who was a member of the Committee for fourteen years, and whose death was recorded in the "JOURNAL" last week. The resolution set forth that the intimate knowledge Alderman Briggs possessed of gas manufacture contributed in a marked degree to the successful development of the gas undertaking.

It is stated in "Engineering Record" that concrete walls in wet ground were made water-tight by the use of steel plates in the recent construction of the sewage-pumping station at East St. Louis (Ill.). As the pump floor is several feet below the level of the normal ground saturation, great precautions were taken against inflow of water. The foundation slab, 7 ft. 6 in. thick, was waterproofed near the middle with asphaltum and waterproofing compounds mixed with the cement. In the side walls, from a level below this waterproofing layer, steel plates were placed at a distance of 1 foot from the back face. They were riveted into a complete shell as placed, and the joints painted with asphaltum.

## THE HAMBURG GASHOLDER ACCIDENT.

At the request of M. Marquisan, the President, an account of the accident in December, 1909, to the gasholder at Hamburg, was given to the members of the Société Technique du Gaz by M. Bonnet, at their annual meeting last month. So much has been written in the "JOURNAL" concerning this accident, that it would be only repetition to give a translation of M. Bonnet's paper, which is itself very properly based on the official reports. These were reproduced at length and commented upon in the last volume of the "JOURNAL" (see pp. 749, 759, 836, and 907). The paper is, however, a clear and concise record of the disaster and its causes; and a brief summary of it may serve as a focus upon the salient features of the event.

*Construction.*—The author deals first with the construction of the gasholder and tank; the restricted site, the bad ground, piles 15 to 18 metres (say, 50 to 60 feet) long, the annular system decided upon, retaining the railway to pass underneath, the external tank side of sheet steel, 74 m. diameter by 12·90 m. deep, the internal side of sheets and reinforced concrete, 69·20 m. diameter by 11·60 m. deep, with an annular space of 2·40 m. between them, the roof of the tank covered with 0·15 m. (6 in.) of water, and supported by girders radiating from the hollow central pillar in concrete, filled with earth, 9 m. high, 10 m. outside diameter, and 4 m. inside diameter. This was the structure laughingly called by the citizens of Hamburg "the largest umbrella in the world."

*Accident.*—The piling was begun in March, 1908, and the four-lift holder was finished in September, 1909. On the 30th of October, the gasholder of 200,000 cubic metres capacity was filled with air, and withstood a hurricane. On the 26th of November it was put into actual work; and on the 7th of December the accident happened, when the second lift had coupled up, and about 100,000 cubic metres of gas were in the holder. First, a light haze of dust appeared in front of the holder; then a tongue of flame from the masonry arches; the top lift fell, rose twice, and again fell; a flood of water escaped, and the structure collapsed, There was no explosion. The foundations of the annular tank and of the centre pillar were not moved; the pillar itself showing numerous cracks. The tank covering had given way, the iron framework was in pieces, and the bottom holder stays were broken.

*Cause.*—The working of the gasholder was not defective. The quality of metal was good. The work had in general been well executed. The author is not entirely in agreement with the expert, Professor Krohn, in regarding the working coefficient of 19·3 kilos. for the steel bars in tension having a breaking-point of 40 kilos., as not endangering the safety of the structure. M. Bonnet points out that the limit of elasticity ordinarily varies between 0·40 and 0·55 of the breaking load. Therefore working at 19·3 kilos. was extremely near the limit. This might have led to an accident if other defects had not intervened to cause it. It was the insufficiency of the coefficient of safety of the pieces under compression of the centre pillar that caused the accident. The builders regarded the bars connecting the pillar to the radiating girders as fastened at one end, whereas in fact they were not, as their riveting to the pillar was altogether insufficient. A mistake was made in applying the Euler formula to the bars in question, in considering that they were anchored when they were not. The moral is: Be very careful in questions of the coefficient of safety; and in the effort to exercise economy, do not exaggerate the resistance of metals.

## WALTON-ON-THAMES NEW PUMPING-STATION.

### Opening by the President of the Local Government Board.

Last Saturday, the new pumping-station which has been constructed by the Metropolitan Water Board at Walton-on-Thames was formally opened by the Right Hon. John Burns, the President of the Local Government Board, in the presence of the Chairman (Mr. E. B. Barnard, J.P.), the Vice-Chairman (Mr. G. S. Elliott, J.P.), the members and chief officials of the Water Board, and a numerous company. The following particulars of the station, which was commenced in October, 1908, as recorded in the "JOURNAL" at the time, were furnished in an illustrated *souvenir* prepared for the occasion.

The Walton pumping-station has been constructed under parliamentary powers granted to the Southwark and Vauxhall Water Company by their Act of 1898, and transferred to the Water Board by the Metropolis Water Act, 1902. The Act of 1898 also included power to construct a river intake, subsiding reservoirs, lines of conduits, a tunnel under the river, and other works. The contracts for the Walton reservoirs and the intake and mains were undertaken by Messrs. John Aird and Sons; and the works were completed and brought into use in 1907. The intake, which is situated on the south bank of the River Thames, is arranged to convey water under the towing path; the quantity passing through being controlled by "Stoney" sluices.

After entering the intake chamber, the water passes through a series of gratings, which collect leaves and other *débris*, and is then conveyed by means of an open culvert leading to the pumping

chamber. This culvert is about 1450 feet in length, and it is capable of conveying 200 million gallons of water per day. The water enters the pumping chamber in the engine-house. The chamber extends the full length of the house, and the suction-pipes of the various pumps pass down into it. The main engines driving the pumps are four in number, and are of the tri-compound three-crank inverted marine type, of 2000 H.P. collectively. The three cylinders of each are 14, 23, and 38 inches diameter respectively, with a piston stroke of 2 ft. 6 in. The working steam pressure is 200 lbs. per square inch, and the engine is run at 120 revolutions per minute. Immediately adjacent to each engine, but below the floor level, is placed a surface condenser, fitted with 660 brass tubes, and having a cooling surface of about 930 square feet. The condenser forms a continuation of the main suction-pipe, and a bye-pass arrangement is fitted, whereby a portion of the suction water can be diverted past the tubes, so as to limit and regulate the amount of cooling water.

The three cranks, which are 9 inches diameter, are in interchangeable sections; the tail-shaft carrying a fly-wheel fitted with a circular barring rack, with which a small steam barring or starting engine engages. At the opposite end of the engine, the crank-shaft is extended, and is attached by a flexible coupling to the shaft of a double-stage centrifugal pump. This pump has 30-inch suction and 27-inch delivery pipes, and is fixed immediately over the condenser. The pump is specially designed to obviate any end-thrust. The capacity of each pump is 25 million gallons per 24 hours to a total head of 64 feet.

In the same engine-house, three hydraulic turbines are fixed. They are of the twin horizontal mixed-flow type, each indicating 150 H.P. at 350 revolutions per minute. These turbines are all coupled direct to single-stage centrifugal pumps, having 18-inch suction and delivery pipes. Each pump is arranged to deliver approximately 10 million gallons to a head of 64 feet in 24 hours. The whole of the pumps connect with two parallel steel delivery mains, 54 inches in diameter, and the sluice-valves are arranged so that the pumps may deliver into either or both of the mains. The three 18-inch pumps are also connected directly into the adjacent "Chelsea" reservoir. A 12-ton traveller, hand-worked from below, commands the machinery in the engine-house.

Steam is supplied to the engines from ten Babcock and Wilcox water-tube boilers divided into five batteries of two boilers each. Each boiler contains 1800 square feet of heating surface and a grate area of 37·4 square feet, and is fitted with a chain-grate mechanical stoker. Each boiler is also fitted with a superheater capable of giving a superheat of from 120° to 150° Fahr. to steam at 200 lbs. per square inch. Two of Green's economizers are also installed at the back end of the boilers in the main flues; bye-pass dampers being fitted to divert the hot gases through the economizers or directly into the main flue to the chimney-shaft. The mechanical stokers are fed by means of coal-pipes communicating with overhead coal-bunkers, which are constructed in steel, and have a capacity of 800 tons.

An electrically driven aërial ropeway is carried from the river side to the boiler-house. It conveys coal from barges in the river and discharges it into the coal-bunkers; the electric motor being at the latter end of the line. The ropeway is fed by means of an electric transporter crane, which is capable of being slewed into position over the river bank, above the coal barge; the coal being lifted from the barge by means of a grab, which travels along the transporter beam of the crane and discharges into a hopper, which in turn delivers its contents into iron skips suspended from the rope. The skips are automatically weighed at the river side on their way to the boiler-house, and the coal is automatically dumped into one of the five coal-bunkers in the boiler-house, as selected, The empty skips travel along the return rope.

The two Walton reservoirs, into which the Walton pumps are arranged to deliver water, are immediately adjacent to the pumping-station, and cover an area of about 175 acres; the top-water area being 125½ acres. The western reservoir, known as the "Knight," has a top-water area of 51½ acres, a depth of 42 feet, and a capacity of 480 million gallons; the eastern, or "Bessborough," reservoir has a top-water area of 74 acres, is 42 feet deep, and has a capacity of 718 million gallons.

The pumps deliver water through two 54-inch mains into the "Knight" reservoir; a proportion being carried to the western extremity by means of a 48-inch pipe, so that a thorough admixture is ensured. It is then allowed to flow from this into the "Bessborough" reservoir, from the eastern extremity of which it is drawn off, and conveyed by two 48-inch conduits along Hurst Road; the mains being continued through an iron-lined tunnel under the Thames at the western portion of the Board's Hampton works. It is then conducted to, and distributed over, the filter-beds (which cover about 50 acres) at these works.

In order to utilize the surplus head of water in the Walton reservoirs, flowing by gravity to Hampton, arrangements are provided whereby the water that is being drawn off can be passed through the hydraulic turbines in the engine-house—the power developed being employed to pump river water into the "Knight" reservoir along with that from the main pumps; or the pumps can be used to deliver the river water direct into the "Chelsea" reservoirs, which form the eastern boundary of the Walton pumping-station. The tail-races are connected to the Hurst Road conduits already mentioned. It is estimated that the subsided water being drawn off will give power enough to deliver at least 33 per cent. of its bulk of river water back into the reservoir.

The system of circulation in the reservoirs already described gives the river water a long period in which subsidence can take place, as it will take a considerable time before the water which has been delivered at the western end of the "Knight" reservoir finds its way to the eastern end of the "Bessborough" reservoir, whence it is drawn off for filtration. The longer the period for subsidence, and the more efficient the circulation, the better the quality of the water before and after filtration. Provision has also been made for the machinery at the Walton pumping-station to deliver water to the Board's Island Barn reservoir, situated to the south-east about 1½ miles from the pumping-station.

A system of connections, ranging in size from 54 inches down to 18 inches, has been installed outside the engine-house; the majority of the large sluice-valves being contained in an open area or pit. They are arranged to be worked from an electric motor and gearing fixed above ground level, adjacent to the valve-pit.

The whole of the pumping-station is electrically lighted; the generating plant, switch-board, &c., being fixed in the engine-house. This plant also provides the necessary power for working the coaling crane, ropeway, drainage pump, &c.

The whole of the works have been designed and carried out under the supervision of Mr. James W. Restler, M.Inst.C.E., the Engineer to the late Southwark and Vauxhall Water Company, and now the Deputy Chief Engineer to the Water Board.

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A very large party, including a considerable number of ladies, left Waterloo Station about half-past one for Hampton Court, which was reached at two o'clock. From a point immediately above Molesey Weir they were conveyed by steamboats to the intake in connection with the pumping-station, where they were received by the Chairman and Vice-Chairman of the Board and the members of the Reception Committee. Having assembled in the vicinity of the intake, they witnessed the opening, by the President of the Local Government Board, of one of the sluice-gates by which the water from the river is admitted into the open conduit leading to the pumps. Afterwards the coal transporter was set in motion by Mrs. Restler, in order that the visitors might see how the coal is mechanically conveyed from the barges on the river to the furnaces in the boiler-house at the pumping-station, some 500 yards distant. A move was then made to the engine-house, the door of which was unlocked by Mr. Burns with a gold key presented to him by Mr. Restler. The visitors then entered, and inspected with much interest the fine display of machinery contained in the handsome building.

Before performing the concluding ceremony—that of starting one of the engines—Mr. Burns addressed the visitors in a characteristic speech. He said they were that day opening another addition to the great water supply of London, without which it would be almost a worthless place. The River Thames had made and sustained it; and its waters constituted it one of the most useful rivers in the world. It was from it that nearly 60 per cent. of London's water supply was obtained; and it was important that the ratepayers should know that the whole of this supply was drawn from non-tidal waters, and stored long enough to sediment, filter, and purify. To-day in London they had, in quantity, quality, and price, one of the best water supplies in existence. It was good because it was constant; cheap, because it made for health and prevented epidemics; and useful, because it was in the hands of the people themselves. The extent to which a good water supply had influenced the reduction in the death-rate, the promotion of temperance, and a greater and wider domestic sanitation, was too obvious to need emphasis. He eulogized the work of the Board in their efforts at unification; and concluded by wishing "good luck" to the establishment, and success to the staff, who he trusted would all realize that the secret of a good water supply was persistent vigilance, close attention, order, and discipline.

Mr. Burns then started the first of the four engines; and, on the motion of Sir R. Melvill Beachcroft, a vote of thanks was accorded to him. He subsequently inspected the buildings and machinery.

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With the object of promoting and systematizing chemical work of general importance to all engaged in the development of that science by research or by teaching, an International Association of Chemical Societies has been formed as the result of a conference of delegates from the chemical societies of England, France, and Germany, held in Paris a short time ago. The three leading societies of the countries named had been invited by the President of the Chemical Society of France to co-operate in this movement and to nominate delegates to represent their respective societies at the inaugural meeting. The representatives of the Chemical Society of London were Professor Percy F. Frankland (President), Professor Meldola, and Sir William Ramsay.

Four waterproofed reservoirs, built by the El Paso South-Western Railway a year ago, have given satisfactory service as the result of surface treatment of the concrete linings. The depth of water is 12 feet. Soap and alum were first used in coating the lining, which was from 4 to 6 inches thick. Two coats of each were applied, beginning with the soap, and alternating. Hot asphalt, or cold prepared asphalt paint, was then put on the surface. Some trouble was experienced in making the asphalt adhere permanently, probably from the fact that the surface was smooth and glossy as a result of the alum and soap treatment. The prepared asphalt paint adhered more firmly, however, and proved generally satisfactory. The work was done on the basis that dense concrete, rich in cement, is the first requisite for water-tightness.

# CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

## The Explosion of a Washer-Scrubber at Stalybridge.

SIR,—As a small contribution to the information available on this subject, the experience of the writer may be of interest.

About three years ago, the Shanghai Gas Company installed a new 3 million "Standard" washer-scrubber of normal pattern, with the ordinary thin sheet-iron washing media. A few weeks after this had been put to work, it was noticed that after the tar had been run off each morning there was a granular, or rather scaly, deposit left in the trough. This was scraped out and put on one side; and when dry, to our surprise, it took fire spontaneously. On examining the deposit more carefully, it appeared to consist of scales of sulphide of iron, minute crystals of naphthalene, and tar.

Things went on in the usual way for some time, until it was found that the liquor connecting-pipe between the two sections of the washer had become stopped. This was cleared; but a few days later two of the run-off pipes in the first section became choked. This was left until the following Sunday, when the foreman took off the run-off pipes and the manhole cover of the first compartment. The pipes were cleaned out, and the washer was flushed with a hose. By 5.30 the run-off pipes were replaced; but the manhole cover was left off. At 7.30 the foreman was called out with the information that the washer was on fire. On reaching the spot, he found burning inside the washer a fierce fire, which was put out by the works fire-hose, and the cover replaced.

On examining the washer next morning, it was found that about half the iron sheets had fused, and were lying at the bottom of the washer in nodules, while the remainder of the sheets were more or less fused together, and two side plates were cracked. While the writer was making this examination, a whitish vapour began to rise again from the plates, and the temperature appreciably rose. The hose was accordingly again turned on, and the washer filled with water and the manhole cover replaced. As far as is known, the washer has not been opened since, for fear of a similar accident.

The cause of the fire was evidently the deposit of sulphide of iron in thin flakes on the washing-plates, to which they adhered with the tar, which, when dry, through the current of air that passed up the openings for the run-off pipes and through the manhole, caused rapid oxidation to be set up to such an extent that spontaneous combustion took place. If vapour had been noticed coming off and the manhole cover replaced earlier, similar conditions to those obtaining at Stalybridge would have been created, with probably a similar result.

H. KING HILLER,
Late Engineer-in-Chief, Shanghai Gas Company.

9, *Victoria Street, Westminster, S.W., June* 8, 1911.

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SIR,—What happened at Stalybridge reminded me of a similar case we had at the Western Gas-Works in Amsterdam some years ago. It occurred while cleaning an annular air condenser which had been in disuse for some time. The manhole of the 22-inch inlet-pipe was taken off, and soon afterwards a little smoke was seen. Looking down into the pipe, we saw smoke and fire and then a flame coming out. By means of water thrown into the pipe the flame was extinguished, and the cleaning ended without disaster, as we took the precaution of keeping water at hand.

The inner surface of the inlet-pipe was incrusted with a dark black substance (sulphide of iron) of about the same composition as spent oxide of iron. A sample of this substance, taken from the pipe, was brought to the laboratory; but it fired before it had reached that place. Later on another sample was taken, with better precautions, and was examined and analyzed; and it proved to be sulphide of iron. So it is a fact, known for years at our gas-works, that gas-cleaning appliances from time to time are incrusted with an inflammable sulphide of iron, which on the admission of air becomes hot, and very soon begins to glow and afterwards catches fire, burning with a blue sulphurous flame.

In cases like this, I think it best, as soon as possible, to throw water on the black incrustation, and keep it wet as long as the apparatus is opened. Once the sulphide starts burning, of course there is a great chance of an explosion, as on the entrance of air an explosive mixture of air and gas may be formed, the more so with leaking valves.

The Stalybridge case is known because an explosion occurred; while no publicity has been given to the Amsterdam case, as no such serious consequence followed. Perhaps we may learn from these occurrences that it may be useful to bring before the public all the more or less uncommon facts, even if these do not happen to be followed by accidents.

J. VAN ROSSUM DU CHATTEL.

*Amsterdam, June* 9, 1911.

## Cost of Manufacture and Selling Prices of Gas at St. Helens and Widnes.

SIR,—Further to my letter appearing in your issue of the 23rd ult., as Mr. Samuel Glover seeks shelter in silence, it is incumbent upon me to comment upon the matter which appears in your news columns, p. 614, as emanating from Mr. Glover in an interview with a representative of the "St. Helens Newspaper and Advertiser."

Mr. Glover says that "figures can be made to prove anything." To my mind, this remark is a suggestion that the comparative figures of cost put forward in my letter are in some way incorrect and misleading; and I desire in the first place to resent any such suggestion, for which, up to the present, absolutely no justification whatever has been shown.

Mr. Glover goes on to say that I attempt to refute the statement made by the "JOURNAL," by using last year's figures; whereas the assertion is made on this year's results. Here again, Mr. Glover is blind to the fact that I used the only figures that were, to me, available, and surely not unfairly so, as I compared with the St. Helens figures my own for the concurrent year!

It is doubtless true, as Mr. Glover points out, that the St. Helens results for 1911 were better than those for 1910, on account of a more favourable residuals market. But there is no special virtue in this for St. Helens alone, as this was a condition of things universal in its application, and to which Widnes was no exception, as the following figures of Widnes costs for 1911 will show:—

| | | |
|---|---|---|
| Manufacture and maintenance . | 4·64 | pence per 1000 cubic feet. |
| Manufacture, maintenance, and distribution . . . . . | 5·53 | |
| Manufacture, maintenance, and distribution, including all charges . . . . . | 9·90 | |

Now, if the representative of the "St. Helens Newspaper and Advertiser" can induce Mr. Glover to state side by side with these figures, his own comparative figures of costs, it will be seen how far I have succeeded in my attempt to refute the statement made by you, Sir, respecting the St. Helens works, to which I still take exception.

Mr. Glover goes on to speak about no charge for fixing stoves and meters, with the incorrect inference that charges for such work may be made in Widnes. While, however, Mr. Glover talks of his rent-free stoves and rent-free meters, he omits to state (what I believe is a fact) that a charge is always made in St. Helens for fixing gas-stoves and fires.

Mr. Glover's remark that he has never attempted to make gas by paying low wages is a most improper suggestion that the standard rate of wages is not paid in the Widnes Gas-Works. However, whatever the individual rate of wages may be—even assuming that St. Helens is paying in excess of the standard rate—the point in the wages comparison between the two works is that, with the advantages of vertical retorts and stoking machinery (labour-saving plant Widnes is without), the wages per 1000 cubic feet of gas made at St. Helens ought to be very considerably below that at Widnes.

With regard to Mr. Glover's suggestion about the charge for water, I beg to assure him that the Borough Accountant of Widnes may be relied upon to see that this as well as all other charges between the two departments are properly made, and that in no respect is one department run at the expense of the other.

One word with regard to the respective illuminating power and purification of gas. I here deny that there is any real appreciable difference in the quality or purity of the two gases. But if Mr. Glover does use a little lime in the process of purification, which costs him (say) one-tenth of a penny per 1000 cubic feet more, I am prepared to give him credit for this, in the comparative figures that I trust the representative of the "St. Helens Newspaper and Advertiser" may succeed in drawing from him.

ISAAC CARR.

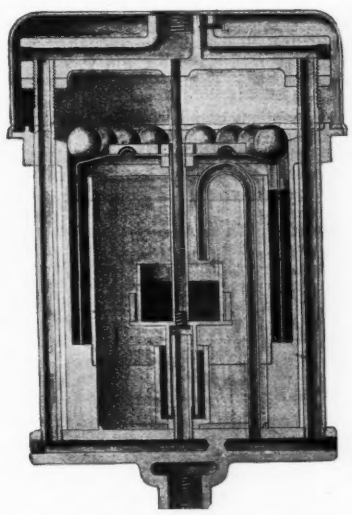
*Widnes, June* 3, 1911.

[This letter had not been received at the time the "JOURNAL" last week went to press—earlier than usual, consequent on the Whitsuntide holidays.—ED. J.G.L.]

## Automatic and Control Distance-Lighting of Gas-Burners.

SIR,—Referring to M. Cabrier's paper, read before the congress of the Société Technique du Gaz en France, as reported in your last issue, p. 670,

The illustrations given, figs. 2 and 3, include a method of automatically relieving the gas-bell of weight which is identical with that comprised in our patent "Standard" gas-controller—viz., balls which roll off the bell as it rises with an increase of pressure and roll on again when the bell falls on the pressure being reduced; both pressures being predetermined. In the "Standard" controller, however, the bell as it rises shuts off the gas supply to the bye-pass, and opens that to the burner, and *vice versâ* as it falls.



We enclose an illustration of the arrangement. Our No. 2 pattern, it may be mentioned, extinguishes the burner light at a second increase of pressure being given.

KIRKHAM, HULETT, AND CHANDLER, LTD.,
per Sidney Hersey, Managing-Director.

*Palace Chambers, S.W., June* 8, 1910.

[The patents referred to by our correspondent are No. 14,973 and No. 21,126 of 1909, and were described and illustrated in the "JOURNAL" for July 26 last year, p. 270, and Sept. 27, p. 857.—ED. J.G.L.]

### Analyzing Small Samples of Gas.

SIR,—In the current issue of the "JOURNAL" I notice a very interesting article by Messrs. M. J. Burgess and R. V. Wheeler, in which it is stated that samples of gas were collected, the volume of which was 2·5 cc., and below is a table giving the percentage volume of nine separate constituents.

I think it would be very interesting to gas chemists, and that Messrs. Burgess and Wheeler would receive their thanks, if they could be persuaded to give a description of the apparatus and methods employed in obtaining so detailed an analysis of so small a sample.

39, *St. Asaph Road, Brockley, S.E., June* 9, 1911. J. HEWETT.

# LEGAL INTELLIGENCE.

### Johannesburg Gas Plant Contract Litigation.

The hearing of evidence began in the Court of Session last Tuesday, and is to last for three weeks, in the action which has been in dependence for some time, at the instance of the Municipal Council of Johannesburg, against D. Stewart and Co. (1902), Limited, and William Beardmore and another. The pursuers seek declarator that they were entitled to reject, on July 5, 1907, gas-producer plant, gas-engines, and electric plant, supplied by Messrs. Stewart and Co., as disconform to contract; and they sue Messrs. Stewart and Co. for £418,694 as damages for breach of contract, and the other defenders for £115,134, the principal sum contained in a bond which was signed by the defenders as cautioners for Messrs. Stewart and Co. The contract was entered into in May, 1905; and in May, 1906, after delivering part of the plant, it was abandoned by Messrs. Stewart and Co., for the reason that they were unable to perform the work. Meantime, the pursuers had paid instalments of the contract price to the amount of £143,095, and this is included in the principal sum sued for. In defence, Messrs. Stewart and Co. deny breach of contract, and say that any failure of the plant they supplied to reach the prescribed tests was due to unsuitability of coal for gas-making purposes which the pursuers supplied.

### Bollington District Council Gas Department.

The gross profit of the Bollington Urban District Council Gas Department for the year to March 31 was £1702, as compared with £1602 twelve months ago (which was then a record). The amount left after making provision for interest, sinking fund, and income-tax is £1156, to which is added a balance of £1244 brought forward and £400 received from loan to partly replace money spent out of revenue on capital account. Out of these sums, the gas for street lighting (estimated at £373) was provided free of cost, and £150 was handed over to the rates. Of the amount left, £808 was expended on capital works; and the balance carried forward is £1473. From Jan. 1 last the price of gas was reduced to 2s. 2d. per 1000 cubic feet to consumers using not less than 250,000 feet per quarter, and to 2s. 3½d. to smaller consumers; the charge to slot-meter users being correspondingly lowered. These reductions represent a sum of about £500 per annum. The average consumption of gas per consumer amounted to about 26,000 feet during the year. Meters and services are provided free of cost, while no charge is made for the loan of cookers, up to very large sizes; and all are fixed free. On the average of 26,000 feet per consumer, these concessions amount to a further 4d. per 1000 cubic feet. The loan indebtedness is £6742; and towards the repayment of this sum, £2441 has been invested in Consols and mortgages of other authorities. The quantity of gas made was 34,655,900 cubic feet, as against 34,549,900 feet the previous year; while the increased sales were 460,000 feet. Unaccounted-for gas was reduced to 7·2 per cent., as against 9·9 per cent. The quantity of coal and cannel used was 2972 tons; and the average make per ton was 11,660 cubic feet, as compared with 10,810 feet. The Chairman, in proposing the adoption of the Gas Committee's minutes and report, said that their present position proved the wisdom of putting down new carbonizing plant, and reflected great credit upon the Engineer and Manager (Mr. W. Rogerson), who had taken much interest in the good state of the works and in providing gas at a low cost.

**Gas Explosion at Nottingham.**—The front room of a small house in Nottingham was wrecked by a gas explosion last Tuesday morning. At the time of the occurrence, several of the employees of the Corporation Gas Department were at work laying new pipes in front of the house; and one of them was cut about the head by falling glass. It is supposed that gas from a leaking pipe had accumulated under the floor of the room in which the explosion occurred.

**Price of Gas at Bangor (Co. Down).**—After some discussion, the Bangor (Co. Down) Urban District Council have adopted a recommendation of the Gas Committee that the price of gas be reduced 2d. per 1000 cubic feet to ordinary consumers, with further concessions of 5 per cent. if accounts are paid within a specified time, an extra 2½ per cent. on accounts of over £20 and under £50, and another 2½ per cent. in the case of accounts amounting to over £50 per annum.

**Profits at Birkenhead.**—When presenting the Gas Committee's minutes to the Birkenhead Town Council, Mr. J. H. M'Gaul pointed out that the consumption of gas in the past year had been 15½ million cubic feet more than in the previous year. The gross profits were £48,979, and the divisible profit £25,094. A sum of £12,546 had been transferred in aid of the rates. The balance to the credit of the renewal fund was £23,648, equal to 5·2 per cent. of the total capital expended, and 7·7 per cent. on the present debt. The reserve fund available for contingencies was £13,333; the total capital expended on the gas-works was £457,937; and the debt outstanding at March 31 was £306,918.

# MISCELLANEOUS NEWS.

### NOTTINGHAM CORPORATION GAS UNDERTAKING.

**The Past Year's Working—Record Carbonizing and Selling Results.**

The Annual Report of the Gas Committee of the Corporation of Nottingham was issued last Thursday. The following are its principal features.

The quantity of gas sold during the year ended the 31st of March amounted to 2,006,425,300 cubic feet, against 1,980,617,900 cubic feet the previous year—an increase of 25,807,400 cubic feet. The total income for the year was £334,545, and the total expenditure £230,832; leaving a balance of £103,713 carried to the profit and loss account. After deducting the interest on capital and sinking funds, and placing £2000 to the depreciation of stoves, there remains a net profit, with bank interest, of £47,142 at the disposal of the Council. The Committee recommend that the sum of £32,000 should be handed over to the Finance Committee in aid of the general district rate; and they have disposed of the balance of £15,142 as follows: £12,142 to the reserve fund, and £3000 to the renewals account for reconstructing the Radford works. They further recommend that the sum of £6500, now standing in the depreciation fund account, be added to the renewals fund.

The Committee are pleased to report that the markets for residuals were better than for the previous year. Compared with 1909-10, the income from tar, sulphate of ammonia, coke, breeze, &c., shows an increase of £10,429, with 3323 tons less coal carbonized.

The Committee call special attention to the serious increase in the rates and taxes. In the year 1909-10, this was £1557, compared with the previous year; and in the past year there was a further increase of £2589.

There was an increase in the amount of gas made per ton of coal carbonized of 284 cubic feet; and the unaccounted-for gas is proportionately less than at any other period in the history of the concern. It was 11,367,400 cubic feet, or 3·93 per cent., less than last year on the total gas made, against 4½ per cent. for 1909-10 and 5·03 per cent. for 1908-9.

The sum of £41,014 was spent during the year in renewals for maintaining the works in an efficient state of repair, against £34,799 in the preceding year—an increase of £6215.

The meter and stove repairing departments, also the show-rooms at Woodborough Road, have been greatly improved. The permanent exhibition of the latest and most up-to-date gas apparatus has been much appreciated, and is of considerable commercial benefit to the undertaking.

The £16,000 allocated for the new retort-house at the Radford works has not yet been appropriated; and a further sum of £3000 has been placed to the renewals account, with the object of remodelling these works. The No. 2 section in No. 3 retort-house at Basford has been entirely reconstructed. New coal-handling plant and storage hoppers have been installed, and are working most satisfactorily. The No. 1 section in No. 3 retort-house at Basford is under entire reconstruction. New coal-handling plant and storage hoppers are being installed.

The reductions made in the price of gas supplied last year amount to £8000 for the portion of the year during which they were in operation; and it is estimated that for the full year they will reach the sum of £11,000. The Committee have under serious consideration the question of the price of gas supplied for manufacturing purposes; and they hope to be able to suggest some concession in the near future.

In the year 1901, the gas made per ton of coal carbonized was 9677 cubic feet, against 11,196 cubic feet in 1909-10—an increase of 1519 cubic feet per ton; and for 1910-11 it was 11,480 cubic feet, or an increase of 284 cubic feet over the preceding year. These results have been obtained through the improvements in the rebuilding of the retorts, and the general all-round increased efficiency at the works.

In conclusion, the Committee report that the Basford and Eastcroft gas-works and the Giltbrook chemical-works are in excellent condition, and that they have under careful consideration the remodelling of the Radford works.

Appended to the Committee's report is that of the Engineer and General Manager (Mr. J. H. Brown) on the works and manufacturing operations, &c., last year. It furnished the following particulars.

The carbonizing plant has again produced record results at all three works, and is being maintained in a thoroughly efficient state. At Eastcroft, the electrically operated retort-house is working very satisfactorily; and improved results are being obtained from the inclined retorts. At the Radford works, the carbonizing plant is being maintained in as efficient a working condition as possible. At the Basford works, exceedingly satisfactory carbonizing results have been obtained. During the past season, the carbonizing was again confined to the plant operated by the compressed air stoking-machines. The No. 2 section in the No. 3 retort-house at Basford was rebuilt last season; and a series of ten coal-hoppers installed in place of the two hoppers originally erected. This improvement will eventually avoid the necessity of night labour with moving machinery. This plant was operated successfully during the past winter; and the No. 1 section is at the present time undergoing reconstruction in a similar manner. This will complete the reconstruction of the No. 3 retort-house at the Basford works. The hand-operated retort-houses are being maintained in good working condition, or being repaired where necessary. The carburetted water-gas plant produced during the year 58,028,000 cubic feet of gas, or equivalent to 2·78 per cent. of the total gas made.

The carbonizing results again show record figures. During the past year, 176,869 tons of coal and 156,055 gallons of oil were carbonized, yielding 2,088,463,000 cubic feet of gas, or 11,480 cubic feet of coal gas per ton of coal carbonized, against the previous highest make of 11,196 cubic feet per ton of coal for 1909-10. Owing to the highly satisfactory

improvement in carbonizing, the increased make of gas—viz., 14,440,000 cubic feet—was obtained with a reduction in the quantity of coal carbonized equivalent to 3323 tons. The gas sold per ton of coal increased from 10,692 cubic feet in 1909-10 to 11,029 cubic feet in the past year. This figure is by far the highest in the history of the undertaking, and is 1883 cubic feet more than the amount of gas sold per ton of coal carbonized for the year 1902. This improvement represents a saving of 37,450 tons of coal per annum on the year's figures as compared with 1902. The gas lost by leakage again shows a remarkable reduction; being only 3·93 per cent. on the total quantity made, or 82,037,700 cubic feet, against 93,405,100 cubic feet before—a reduction of 11,367,400 cubic feet. The figure for 1902 was 144,470,700 cubic feet, or 7·43 per cent. on the quantity of gas made for that year.

There was a gratifying increase of 25,807,400 cubic feet in the quantity of gas sold during the past year; the figure being 2,006,425,300 cubic feet. This constitutes a record in the history of the undertaking; the quantity of gas sold never having previously reached the figure of 2000 million cubic feet in one year. The reduction by 11,367,400 cubic feet in the unaccounted-for gas, together with the increase of 14,440,300 cubic feet in the gas made, make up the figure of 25,807,400 cubic feet increase in gas sold.

The chemical works and sulphuric acid plant are being well maintained, and continue to give very satisfactory results; 2350 tons of sulphuric acid having been produced during the year. The sulphate of ammonia plant at Basford has with some difficulty dealt with the whole of the ammoniacal liquor produced at the three works; but to enable it to do so, it has had to be worked above its full normal capacity, owing to the greater yield of ammonia obtained from the coal.

Improved working results have been obtained throughout every department of the undertaking. The anticipated improvement in the chemical market did not develop to the extent expected. The pneumonic plague caused a sharp rise in carbolic acid and all disinfectants; but the total increase in values is not of great moment. The returns from coke have risen from £32,365 to £36,804—an increase of £4439. This corresponds with a decrease of £5199 in 1909-10. The receipts from sulphate of ammonia have increased from £16,498 to £19,949—a difference of £3451, due principally to the improvement in the price of sulphate caused by its more extensive use in the United States as a fertilizer. The receipts from tar and chemical products last year were £16,572, against £13,922 before—an increase of £2650, in spite of the decreased quantity of coal and oil carbonized to the extent of 3323 tons. The extensive use of coal tar for road-spraying has taken very large quantities of tar from the chemical market. The total receipts from residuals for the year were £73,325, against £62,785 for 1909-10, or an increase of £10,540.

The rate of wages shows a considerable increase for the year.

Coal (including 156,055 gallons of gas oil) cost the department £90,470, against £87,767 in 1909-10—an increase of £2703, due to the advance in price. Rates and taxes rose from £18,277 in 1909-10 to £20,866 last year—an increase of £2589. This, together with the increase of £1557 before, represents a rise of £4146, or equivalent to a ½d. per 1000 cubic feet of gas sold, on the two years. The charge for rates and taxes now represents 2½d. per 1000 feet of gas sold.

The full effect of the concession in the price of gas to prepayment consumers was experienced during the year; the rebate amounting to £5336, against £2389 in 1909-10, or an increase of £2947. The reduction in price to ordinary consumers, which has operated since September, 1910, has affected the year's accounts by about £5000. This, together with the increase in the rebate to prepayment consumers, represents a concession to consumers of about £8000 more than in the previous year. This has been largely counteracted by the increased quantity of gas sold; the receipts for gas appearing in the accounts as only £3849 less than in 1910. The number of consumers connected with the mains shows an increase of 2403 for the year.

The increase in consumption is entirely due to the greater number of prepayment meters. Incandescent burners have again reduced the average quantity of gas used per consumer. In 1902 there were 51,800 consumers, using 1,651,052,000 cubic feet of gas, or 31,873 cubic feet per consumer. In the year 1910-11, there were 76,783 consumers, using 1,886,487,100 cubic feet of gas, or 24,569 cubic feet per consumer, against 25,062 cubic feet for 1909-10.

The consumption of gas by the public street-lamps, for which, since 1902, incandescent burners have been adopted, is again striking proof of the saving effected by this system of lighting, and the consequent loss of consumption to the department. The figures are :—

| Year. | No. of Lamps. | Total Consumption of Gas. |
|---|---|---|
| 1902 | 5787 | 115,026,500 cubic feet. |
| 1911 | 7601 | 94,518,700 ,, |

This reduction in the consumption of gas in street-lamps alone is equivalent to 56,500,000 cubic feet, representing a decrease in the cost to the lighting authorities of £6120 per annum.

The proportion of prepayment meters compared to ordinary consumers has risen to 48·33 per cent., against 46·03 per cent. in 1910 and 27·56 per cent. in 1902. This largely accounts for the decrease in the quantity of gas sold per consumer, and clearly demonstrates the change which is taking place in the character of the business and the necessarily greater cost of administration.

Mr. Brown gives a table showing the amount of gross profit realized by the gas undertaking from 1902 till the present time. In the earlier year, it was £75,907; in the past financial year it was £103,713.

The following statement of working results shows the development of the undertaking since 1902 :—

| | 1902. | 1910. | 1911. |
|---|---|---|---|
| Coals carbonized (tons) | 196,681 | 185,247 | 181,924 |
| Gas sold (thousands) | 1,798,779 | 1,980,618 | 2,006,425 |
| Do. per ton of coal | 9,146 | 10,692 | 11,029 |
| Average price o gas | 2s. 8·93d. | 2s. 6·18d. | 2s. 5·33d. |
| Gross profit | £75,907 | £110,297 | £103,713 |
| Interest and sinking-fund charges, &c. | 50,891 | 54,281 | 54,570 |
| Net profit | £25,016 | £56,016 | £49,143 |
| In aid of rates | 24,516 | 35,000 | 32,000 |

The concluding portion of the report relates to the distribution department. It shows that the total mileage of mains is 390·84—an increase of 7·09 miles during the year. The number of meters fixed to March 31 (including 480 lamp meters), was 77,263; being an increase of 2413 meters. Of these, 74,433 belonged to the Gas Department and 2830 to the consumers. The demand continues for prepayment meters. At the end of the financial year, 37,340 of these meters were in operation—an increase of 2886 on the previous year. There were 2917 new gas services laid in the past year, compared with 2946 before. Mr. Brown says the application of gas for trade and domestic purposes, other than for lighting, continues to increase. There are at present in use about 31,073 cooking-stoves, 15,538 gas-fires, and 750 gas-engines, besides a very large number of other appliances of almost every description, which have not been numbered. Of the 31,073 cookers in use, 9264 are rented from the department, and 21,107 are supplied with the automatic meter rent free.

Appended to the report is a table showing the comparative workings per ton of coal and per 1000 cubic feet of gas sold for the past and the preceding year; and this is followed by the accounts of the Gas Department in the usual form.

## ST. HELENS CORPORATION GAS UNDERTAKING.

### The Past Year's Profits.

At the Meeting of the St. Helens Town Council last Wednesday, the minutes presented by the Gas and Lighting Committee contained the following statements.

At the meeting of the Committee, the Treasurer submitted a balance-sheet for the year ended March 31 last showing a net profit, subject to audit, of £11,984; and it was resolved that the profit should be appropriated as follows (the additional £1000 allocated to the borough fund being in view of the extraordinary expenditure to be incurred during the current financial year) : Capital account for extensions to mains and services, £2320; works improvement account, £3664; the borough fund as the Finance Committee may direct, £6000—total, £11,894. It was also resolved that the price of gas for the year ending March 31, 1912, be the same as that charged for the year ended March 31, 1911—viz., for lighting and all purposes other than power (1) when supplied through ordinary meters 2s. 2d. per 1000 cubic feet within, and 2s. 8d. per 1000 cubic feet without, the borough, subject to the usual discounts. (2) When supplied through prepayment or coin meters, 1d. per 35 cubic feet within, and 1d. per 30 cubic feet without, the borough. For power purposes, 1s. 8d. per 1000 cubic feet within, and 2s. 2d. per 1000 cubic feet without, the borough, subject to the usual discounts. The Chairman reported that the Gas Engineer (Mr. Samuel Glover) would this month complete forty years' service at the gas-works; and it was resolved that the Committee desire to congratulate the Gas Engineer on his lengthy service, and to place on record their appreciation of the manner in which he has carried out his duties. At a special meeting of the Committee, the Architect submitted amended plans and specifications for the new gas-works offices and show-room, which were approved. Tenders were submitted for the erection of the new offices and show-room; and it was resolved that the tender of Messrs. Waizbom and Son, of St. Helens, be accepted.

Mr. Crooks, in moving the confirmation of the minutes, said that during the year 34 additional lamps had been erected, and the town was now lighted by 2148 lamps, of which 1463 were on the incandescent system. By the adoption of these lights on the 1463 posts in the town, the lighting efficiency of the lamps had been raised from 14,630 to 146,300 candle power. There were 73·2 miles of streets lighted during the year, at a cost of £6174, against 72 miles, at a cost of £5862, in 1909-10. The total quantity of gas made was 488,061,800 cubic feet, which is an increase of 25,409,100 cubic feet, or 5·49 per cent. The unaccounted-for gas amounted to 15,750,600 cubic feet, or 3·22 per cent. of the total make. The bulk of fuel used in the manufacture of gas, including coal and cannel, was 47,401 tons 15 cwt.; and the illuminating power of the gas supplied was upwards of 18 candles. The number of consumers' meters added during the year was 544, which brought up to 17,505 the total now at work. The number of stoves of all kinds in use was 14,535. The total quantity of gas used in engines was 24,019,700 cubic feet; and the number of gas-engines at work was 123, amounting to a total of about 1688 H.P. The total net income from gas sold was £49,503; while the amount collected from coin-meters was £23,733. The total income from bye-products was £23,610. The wages paid by the Gas Department during the year amounted to £18,278. The net profit, after payment of all interest, sinking fund, and depreciation charges, was £11,984, of which the Committee had voted £6000 to the borough fund, &c., account, and the balance to capital account. The total amount devoted to the borough fund account out of the gas-works profit was £97,030; while the total amount written off the gas-works capital account was £97,304. The total expenditure on the gas-works capital account was £356,126, of which £217,459 had been repaid or provided for; leaving a net debt on capital account of £138,667. The success of the continuous vertical retort system, which had now been working for nearly three years, had fully justified the erection of a larger installation on the site of the old baths. One setting of the new retorts had been tested, and was giving every satisfaction; and the Committee proposed to invite the Council to join them in an inspection of the works shortly. In conclusion, he said he thought the Council would agree with him that the Engineer and his staff were to be congratulated on the excellent results they had obtained during the past year.

Mr. W. Bates suggested that the Committee should make an increased allowance for the reduction of the rates.

Mr. Waring proposed, as an amendment, that the minute referring to the charge for gas be taken back, with the view of reducing to 2s. 3d. per 1000 cubic feet the price charged to prepayment meter consumers.

Mr. Heaton thought there should be a reduction in the charge for the public lighting of the borough.

Mr. CROOKS, in reply, said the Committee could not possibly see their way to recommending a reduction in the price of gas, either to the prepayment meter consumers or for the public lighting. They had carefully considered the matter, and had come to this conclusion. The prices charged to the slot-meter consumers in St. Helens compared favourably with those in other towns in Lancashire. The extra charge did not cover the cost of collection.

After some further remarks, the amendment was put and lost, and the minutes were confirmed.

## DEVONPORT CORPORATION GAS UNDERTAKING.

### The Past Year's Working.

At the Meeting of the Devonport Town Council last Thursday, the presentation of the minutes of the Gas Committee afforded an opportunity to the Chairman (Alderman Tozer), in moving their adoption, to make a statement on the position of the gas undertaking.

Alderman TOZER said the Committee had had under consideration the tenders for gas coal, and had accepted the lowest of suitable quality. The price was 8d. per ton less than they paid last year. The accounts for the year showed a gross profit of £22,922, and a net profit of £4287. For the first time, the Committee were able to recommend the Council to reduce the price of gas; and having made a beginning, he hoped they would be able to propose similar reductions year after year. During last year, the sales of gas increased by 3·7 per cent., while in the nine years in which the undertaking had been in the hands of the Corporation, the increase in the consumption had been just over 100 million cubic feet. In 1903, the first year of the Corporation's control, the income from sales of gas was £33,836; while last year it was £47,196, which was £1684 more than the previous year. It was very satisfactory to know that, though they had to pay a higher price for coal last year, the revenue from residuals increased to a very satisfactory degree—coke yielding £300, tar £200, and sulphate of ammonia £300 more than the year before. From residuals, therefore, they obtained £800 more. Another pleasant feature, and one on which the Engineer (Mr. W. P. Tervet) was to be congratulated, was that the cost of the manufacture of gas had been reduced by 1d. per 1000 cubic feet. When the alterations now in progress at the works were completed, the Engineer expected that the cost would be further reduced; and he believed they would then be able to remove the cause of the many complaints they had had as to the quality of the gas, because they hoped in time to use not more than 10 per cent. of water gas. The money granted for the alterations at the works was being well spent, as was shown by the fact that the six benches of retorts which had been reconstructed were producing more gas than eight benches under the old system. The gross profit of the year was sufficient, if they were a private concern, to pay 7 per cent. on the whole of their capital. In 1903, the gross profit was £8214, against £22,922 last year. The total amount borrowed on the undertaking was £326,894; and during nine years they had repaid capital or provided for the stock redemption fund to the amount of £69,160. In the past year, the sum of £18,634 had been paid for interest and towards the redemption of stock, which showed what they were doing for posterity. After deducting this sum, they had a net profit of £4287, which was a record for the undertaking. It was recommended by the Committee that the price of gas should be reduced 2d. per 1000 cubic feet, which meant that the ordinary consumer would pay 2s. 4d., instead of 2s. 6d., and those who used gas for power 2s. 1d., instead of 2s. 3d. Consumers supplied through prepayment meters would have a greater quantity of gas for 1d., and there would be a reduction of 50 per cent. on the rental of stoves, and 5 per cent. on the charge for street lighting. These concessions would apply to nine months of the present financial year, and would absorb £2500. The Committee believed that, with a saving of £700 or £800 in the price of coal and the reduced cost of production, the net profit next year would not be less than it was now. If this should be so, he should then advise a further reduction in the price of gas. Their neighbours in Plymouth had very cheap gas; and he was of opinion that it was only a question of time when the price would be lower in Devonport than it was in Plymouth.

The minutes were confirmed.

**Cowes Gas Supply.**—The accounts for the year ended the 31st of March last of the Cowes Gas-Works show that since these came into the possession of the District Council in 1898 loans amounting to £70,133 have been taken up, of which £18,265 have been repaid, including £1774 in the past year. The revenue account showed a total income of £10,363, and a total expenditure of £6296; leaving a balance of £4067. The cost of manufacturing gas in 1899 was £3543, compared with £6199 during last year. The present price of gas is 3s. 4d. per 1000 cubic feet; the maximum figure during the ownership by the District Council being 4s. 3d.

**Middleton Gas-Works Results.**—Mr. Parker, in moving the adoption by the Middleton Town Council of the Gas Committee's minutes, said he was glad to draw the attention of the members to the fact that their Engineer (Mr. C. F. Broadhead) was to read a paper at the annual meeting of the Institution of Gas Engineers on how he had, by the aid of the Gas Committee, modernized an old and worn-out gas-works. They, as a Committee, felt honoured that a young man in his first situation as a gas engineer should be asked to read a paper at the annual conference of gas engineers. Another matter of which he would like to inform the Council was that they had made a profit on the past year's operations at the gas-works of £3105. They proposed to come to the aid of their friends who had helped them for so many years to come round the corner, and to give to the Lighting Committee 3d. per 1000 cubic feet on all the gas they consumed. They had also decided to give the penny-in-the-slot meter consumers about 3½d. per 1000 cubic feet by supplying them with 2 cubic feet extra for a penny. The total cost of these concessions would be about £1600 per year.

## WEST BROMWICH GAS SUPPLY.

### The Deputy-Treasurer's Report.

In the last issue of the "JOURNAL," there were reproduced the main portions of the annual report to the Gas Committee of Mr. Harold E. Copp, the Engineer of the West Bromwich Gas-Works; and opportunity is now taken of noticing some of the points in the report of the Deputy-Treasurer (Mr. Herbert Kirk).

Mr. Kirk, who, of course, deals with financial matters, says that for the financial year to March 31 the total income on revenue account amounted to £55,738, an increase of £633 compared with the previous year. Sales of gas came to £40,450, or a gain of £1105; there being an increase in the sales for lighting as well as for manufacturing purposes. With regard to residual products, higher prices prevailed throughout the year; and as a result there was an increased income from tar and ammoniacal liquor amounting to £312 and £160 respectively. On the other hand, however, there was a decrease of £847 in respect of coke, in consequence of a less quantity having been sold. There was a reduction in the quantity of coke made during the year by reason of a decrease in the quantity of coal carbonized. A greater quantity of coke was used in the manufacture of carburetted water gas, and a larger stock was held at the end of the financial year—thus reducing the quantity available for sale. The income of £13,512 from residuals and sundries, therefore, shows a reduction of £392.

The total quantity of gas sold was 331,850,219 cubic feet, an increase of 10,343,619 feet when compared with the previous year, equal to 3·21 per cent. The gas lost by condensation and leakage was 19,971,781 cubic feet, equal to 5·58 per cent. The gas sold is equal to 6,938,554 cubic feet per mile of main, or an increase of 120,193 feet per mile. The number of houses in the borough in November last was 15,179; and of these, 5668 are supplied with gas through ordinary meters, and 5842 by means of prepayment meters. The total number of consumers of all classes at the end of the financial year was 11,812, an increase of 132.

The total expenditure on trading account amounted to £43,809; being an increase of £1073. The gross trading profit carried to the profit and loss account is £11,929, against £12,369, a decrease of £440. The profit and loss account has been charged with interest on loans and corporation stock and the proper instalment for the redemption and extinction of the debt, together amounting to £8188; leaving a balance of £3741 as the net profit for the year, compared with £4110 for the previous year. The balance at the credit of profit and loss (appropriation) account at the commencement of the year was £13,162, of which sum £1000 was transferred in aid of the general district rate, and £1333 was transferred to the credit of the extensions suspense account. A net balance of £10,829 remained, which, with the surplus of £3741 for the previous year, makes a total balance of £14,570 to be carried forward.

## CANNOCK GAS PROVISIONAL ORDER.

### Consent of the Local Authorities Dispensed with.

The Board of Trade have reported to the House of Commons, in accordance with section 4 of the Gas and Water Works Facilities Act, 1870, that in making the Cannock Gas Provisional Order they have dispensed with the consent of the Cannock Urban District Council, the Cannock Rural District Council, the Hatherton and Shareshill Parish Councils, and the parish meetings of the townships of Huntington and Saredon.

The application for the Order was made by the Cannock, Hednesford, and District Gas Company, Limited, who sought power to supply gas in part of the parish of Norton-under-Cannock, known as Norton Canes, the townships of Essington, Hilton, Shareshill, Saredon, Hatherton, Huntington, and Brocton, the parish of Teddesley Hay, and the Hazleslade Ward of the parish of Brereton, all in the county of Stafford. Objections to the Order were lodged by the Cannock Urban and Rural District Councils and various Local Authorities, as well as by Mr. J. E. Stokes. Other objections were lodged; but they were subsequently withdrawn.

Having failed to obtain the consent of the two Councils and the authorities interested, the Company requested the Board of Trade to dispense with such consent. The Board accordingly held an inquiry at their offices with respect to the proposals of the Draft Order and the reasons of the authorities for not granting their consent. It appeared that the Cannock Urban District Council desired the insertion in the Order of a clause applying the provisions of section 40 (referring to the purchase of the undertaking by the Cannock Urban District Council) of the Cannock Gas Order, 1898, to the Company's undertaking as proposed to be extended by the Draft Order; and they also asked for the reduction of the proposed standard price of 4s. per 1000 cubic feet. As negotiations regarding the purchase clause were proceeding between the parties, the question was not discussed at the inquiry. Subsequently, however, the Board learnt that the parties were unable to come to terms; and no clause was inserted in the Order. After hearing the parties on the question of the price to be charged, the Board decided to fix the standard at 3s. 3d. per 1000 cubic feet, but to allow an increase of price to 3s. 6d. before the usual provisions as to decrease of dividend take effect.

The Cannock Rural District Council and the Local Authorities within the rural district objected to the Order on the ground that, owing to the scanty population, it was unlikely that the Company would be prepared to extend their mains farther into the district for some considerable time, and that in the meantime neighbouring gas undertakings which might be able and willing to supply the district would not be able to do so. After full consideration, the Board decided to exclude the parish of Teddesley Hay and the townships of Essington and Hilton from the extended limits of supply, but to include

the townships of Hatherton, Shareshill, Huntington, and Saredon. Mr. Stokes's objection related to the supply of gas in the parish of Teddesley Hay, which the Board decided (as stated above) to exclude from the extended limits of supply.

## STOCKPORT GAS-COAL CONTRACTS.

When the minutes of the Gas Committee were brought forward for confirmation at last Wednesday's meeting of the Stockport Town Council, Mr. Noden, referring to the purchase of 40,000 tons of coal, said the system of testing in use at the gas-works was not one that gave a correct idea of the quality of coal they were getting. It gave the proper value of the coal when it was delivered at the gas-works; but he considered the best way was to get the pit price. He submitted that coal from the collieries round about Stockport cost only a few pence per waggon on delivery at the gas-works; whereas that from collieries farther away cost anything up to 3s. 4d. per ton. The present system of testing the value of coal did an injustice to these collieries, and he objected to the way in which the tenders were let. As one who was present at the meeting of the Gas Committee, he wished to say the members were told what coals should be struck out of the list and what coals bought. They started with a resolution that only 40,000 tons should be bought; and this was done in order that the Council could get 15,000 tons in spot lots. It was unbusinesslike to disregard, as the Committee had done, coals of a higher value, and take in preference coal of a lower standard. It was not the proper thing either that the Chairman should appear, as he did, with a prepared list of the offers of coal—those to be accepted and those to be rejected.

The Chairman of the Gas Committee (Alderman Fernley) said the last statement was absolutely untrue. With regard to the testing of coal, the Committee had gone to great pains in making tests. The system they had adopted needed little explanation, when they remembered the results of the gas undertaking during the last six years. If the policy had been disastrous, he wondered how it was that the profits had increased in a short period from £8000 or £10,000 to £26,000. Mr. Noden and he agreed with some methods of purchasing coal; for instance, with regard to buying by bargaining instead of by contract. If this had been done, they would have gained £1000 or £1500. But he objected to Mr. Noden now attacking a policy in open Council which he had agreed to in previous years.

The minutes were confirmed without further discussion. They included one for the purchase of 5000 tons of coal at an average price of 11s. 1·76d. per ton.

## WORKINGTON CORPORATION GAS UNDERTAKING.

### Annual Report and Accounts.

The Gas Engineer and Manager to the Workington Corporation (Mr. E. G. Hutchinson) has presented to the Gas Committee his report for the twelve months ended the 31st of March—his first full financial year. He says that, owing to the lack of employment, and the consequent removal of a number of families into and from the town, much extra work, as also cost, was thrown upon the Gas Department; the large number of discontinuations of, and applications for, gas being quite abnormal—amounting in the aggregate to 2104. The total quantity of coal and cannel carbonized was 9561 tons, compared with 9620 tons the preceding year; the make of gas being 105,980,000 cubic feet, compared with 105,059,000 cubic feet in 1909-10. The make per ton was 11,084 cubic feet, compared with 10,920 cubic feet. The total quantity of gas sold through meters was 87,199,300 cubic feet, against 87,364,200 cubic feet; and the gas accounted for was 99,465,800 cubic feet, compared with 99,361,700 cubic feet. The residuals produced per ton of raw material carbonized were: Coke and breeze, 13·5 cwt.; tar, 11·62 gallons; sulphate of ammonia, 24·04 lbs. The number of ordinary meters in use at the close of the year was 1834, and of prepayment meters 2259; the figures for the preceding year being 1874 and 2098.

Following Mr. Hutchinson's report is that of the Borough Treasurer (Mr. John Noble). It shows that the gross profit in the past financial year was £3996, compared with £3854 before; the net profit being £1713, against £1539. In accordance with instructions from the Council, a sum of £650 was transferred to the old district fund; and £202 spent for building the new revivifying shed in connection with the purifying plant was defrayed out of the year's profits. Of the balance remaining, £823 was carried to the credit of the working capital account, bringing it up to £2500. The net capital liability on the gas undertaking is now £12,327. Mr. Noble says it is a matter for congratulation that the results of the year's working constitute a record; and that the financial position of the gas undertaking is now in every way sound and satisfactory.

The reports came before the meeting of the Town Council last Tuesday; and it was then agreed to reduce the price of gas from 2s. 4d. to 2s. 3d. per 1000 cubic feet.

## DUNDEE CORPORATION GAS UNDERTAKING.

At a Special Meeting of the Law and Finance and Gas and Electricity Committees of the Dundee Corporation held a few days ago, the accounts of the Gas Department, reference to which was made in the "Notes from Scotland" last week, were under consideration.

Treasurer SOUTAR said the culminating interest in the accounts was that they made it possible to propose, first, a reduction of 1d. per 1000 cubic feet in the price of gas to all ordinary consumers. When Mr. Yuill came to Dundee in 1902, gas was sold at 3s. 6d. per 1000 cubic feet. It was now down to 2s. 2d. Notwithstanding that there was a reduction in price last year, the Committee were also in a position to redeem the promise they then made, on the point raised by Bailie Reid, and to allow an extra penny off the charge to automatic consumers—being a reduction in their case of 2d. per 1000 cubic feet. They further proposed to reduce the public lighting rate by 3d.; making it 1s. 8d. per 1000 cubic feet, instead of 1s. 11s. as at present. This item alone would effect a saving of about £650 on the rates. Last year a sum of £581 was received as rental for gas-fires; and, in view of the success they had experienced with free cookers, they recommended that these fires be supplied free of hire, to begin as from the 1st of October next, in order that the alteration might not interfere with the financial arrangements of the Gas Department. These concessions, taken together, conferred a benefit on the community of about £6000 per annum, and showed how absolutely justified capital outlay was, and how absurd was the theory that a board had to wait until income was secured until it showed enterprise and incurred reasonable expenditure. They purposed engaging the services of two or three ladies holding diplomas in cooking, whose duty it would be to call upon consumers to assist and instruct them in the proper use of gas-cooking appliances. The quantity of gas sold last year showed an increase of about 17 million cubic feet. Its sale produced £93,483, or £2384 more than before. The amount realized for coke was £1217 more; for sulphate of ammonia and from tar, £1489 more; and the waggon revenue was £120 higher. Carbonizing charges—coal, wages, carburetted water gas, and benzol—were £1458 less, due to a better class of coal being used, and improved carbonizing. The purifying account showed a reduction of about £731, which was the result of the efficient working of the new purifiers, recently installed. The gas-stove repairs and fixing account was a little in excess of the previous year. This item included £2173 for depreciation, being equal to 10 per cent. on the capital value. The fixing and repairing of gas-fires had cost £1759, which included £723 for depreciation—being equal to 20 per cent. on the capital value. The net income was £130,610, or £4210 more than in the previous year, and £140 more than the estimate submitted. The expenditure was £103,170; being £4108 in excess of the previous year. A sum of £1000 had again been carried to a contingent fund account. He moved approval of the accounts and estimates.

Mr. W. HIGH, in seconding the motion, said that in ten years the capital debt of the gas undertaking had been reduced from £424,227 to £378,600.

Lord Provost URQUHART concurred with Treasurer Soutar with regard to proper capital expenditure by a municipal department, and compared the state of affairs to-day with what existed twelve or fifteen years ago, before the reconstruction of the gas-works was undertaken. In one year, having regard to the quality and quantity of the coal bought, and the yield of gas it gave, they were actually faced, on the twelve months' working, with a loss of £7000. After this a forward policy was adopted, and the results had been eminently satisfactory. He congratulated the Engineer, and proposed a vote of thanks to Treasurer Soutar for his statement.

This motion, as well as that of Treasurer Soutar for the adoption of the accounts, was carried unanimously.

## NEATH CORPORATION GAS UNDERTAKING.

At the last Meeting of the Neath Town Council, the Gas Manager (Mr. R. A. Browning) presented his yearly accounts, as audited. The statement of loan capital showed that, out of £109,925 of borrowed capital, £72,986 had been repaid; leaving a balance of £36,939 now owing. The capital account showed that £2073 had been expended. The revenue account showed that the gross profit for the past year amounted to £5890; being an increase of £233 on the previous year. Gas and residual products showed satisfactory increases. The price of gas was reduced in the past year from 3s. to 2s. 10d. per 1000 cubic feet; and the charge for public lamps from £4 to £3 10s. per lamp. The profit and loss account showed that, after paying £1650 interest, £2925 had been placed to the repayment account, and £1000 applied to the relief of the rates. The sum of £800 was carried to the suspense account, with £700 transferred from it to the depreciation fund account. A balance of £4836 had been carried to profit and loss in the next account. The recommendations of the Gas Manager and the report were adopted.

**Devonport Water Undertaking.**—In moving the adoption of the annual accounts of the Water Committee, at the meeting of the Devonport Town Council last Thursday, Alderman Blackall said the net profit of £2617 would be carried to the reserve fund, and that for at least fifteen years the water undertaking would not cost the ratepayers anything.

**Proceedings against the Llanelly Gas Company.**—At the Llanelly Police Court, on the 29th ult., the Urban District Council summoned the Gas Company for supplying gas containing certain impurities. Mr. Martin Richards, who appeared for the Company, said that he had only just been instructed; and as the matter was a technical one, he would like to have an adjournment for a fortnight. This course was acceded to by the Bench.

**Details of Hot-Water Work.**—Mr. J. W. Auchterlonie, the Engineer of the Cambridge Gas Company, presided at a gathering of the staff on Wednesday, the 31st ult., to hear a lecture, dealing with the details of hot-water work, delivered by Mr. Frederick Dye (Messrs. John Wright and Co.). There was a good gathering in the Company's lecture room, and the lecture was well received. An interesting discussion followed. A practical demonstration of the action of a thermostat concluded the meeting.

**Suicides by Gas.**—At Blackpool, William Jack, a tea merchant, was found dead with his head covered in a box. In his mouth was an india-rubber tube connected with the outlet of the prepayment meter, in which four coppers had been previously placed. Maude Fellowes, the wife of a London artist, who had suffered from bad health, was found huddled up in a chair—dead, with a tablecloth over her head. The gas-tap in the room was full on, and attached to it was a piece of rubber tubing, the other end of which had apparently been in deceased's mouth.

## GAS AND ELECTRICITY AT STAFFORD.

The Stafford Gas and Electricity Committee have prepared their report to the Town Council on the results of the working during the past financial year.

From the report, it appears that the gas sent out from the works (which are under the management of Mr. W. M. Valon) during the year was 211,852,000 cubic feet, as compared with 202,436,000 cubic feet in the year 1909-10; and the unaccounted-for gas amounted to 4,358,630 cubic feet, or 2·05 per cent. Sales of gas yielded £25,084, a decrease of £503; and residual products produced £7620, compared with £7092. Coals cost £10,089, being an increase of £395; and the total working expenses were £8751, against £8109. Stove-hires, less repairs, yielded a profit of £11; and gas-fittings, a profit of £298. The total revenue was £33,473, the expenditure £19,301; leaving the gross profit for the year at £14,172, compared with £15,280 for the preceding year. After deducting charges against net revenue account amounting to £6848, and adding the balance of £345 brought forward from last year, there is an available balance of £7710, compared with £8450. This result has been attained with a reduction, since June 30 last, of 2d. per 1000 cubic feet to all ordinary and prepayment consumers; otherwise the profits would have been increased by a further sum of £1010. The Committee recommend that, out of the net profits, £3500 be handed over to the district fund in relief of the rates; that £50 be given to the Free Library Committee; that £1250 be transferred to the credit of the suspense account relating to the carburetted water-gas installation; that £2004 be added to the reserve fund; and that, after payment of the usual bonus, the balance be carried forward. No addition has been made to capital account, which remains at £113,155. Loans repaid amount to £75,718; the balance now owing under this heading being £38,164 only. With this year's contribution, the rates will have benefited since the works were taken over by the Corporation to the extent of £58,775 from the profits of the gas undertaking.

According to an analysis of the accounts of the Gas Department by Mr. Valon, the capital invested in the undertaking at the close of the year amounted to £38,164; being at the rate of £2 2s. 4d. per ton of coal carbonized, and 3s. 9d. per 1000 cubic feet of gas sold. The quantity of coal, &c., used for producing gas was 18,052 tons; the make per ton being 11,744 cubic feet, of which 11,336 cubic feet per ton were sold—or 96·7 per cent. on the make. The residuals sold per ton of coal were: Coke, 9·72 cwt.; tar, 11·04 gallons; sulphate of ammonia, 18·41 lbs.—the net proceeds from the sale of residuals being 75·5 per cent. on the cost of the coal. The net profit was equal to 8s. 1·915d. per ton of coal carbonized, and 8·637d. per 1000 feet of gas sold.

In the Electricity Department, there were sold 475,358 units. Of this quantity, 152,818 units were used for lighting purposes, and 314,315 units for power. The public lamps took 8225 units. The total units sold in the year 1909-10 was 390,010. The equivalent of 1408 eight-candle power lamps was connected to the mains during the year; and ten additional motors were connected up. The revenue from all sources amounted to £4924, while the expenditure was £2190; the gross profit being £2734, compared with £2478. The charges against net revenue account amounted to £2126, leaving a net profit of £607, which, added to £144 brought forward, makes £751. From this, the Committee propose to transfer £600 to the depreciation account; and after deducting the bonus, to carry the balance forward. The total capital expenditure remains at £32,500; and loans repaid amount to £13,618. This leaves £18,881 now owing on loan account.

An analysis of the accounts of the Electricity Department shows that the returns from the sale of current were equal to 2·41d. per unit. The profit on the year's working was equivalent to 0·3d. per unit sold.

## WREXHAM ELECTRICITY UNDERTAKING.

### A Local Government Board Inquiry.

An inquiry lasting several hours was lately held by Mr. T. C. Eken, on behalf of the Local Government Board, at Wrexham; the subject being an application by the Town Council for sanction to borrow £4145 for the purposes of the electricity undertaking. The application was opposed by the Wrexham Gas Company and the Wrexham and East Denbighshire Water Company, for whom Mr. L. Hugh Jones and Mr. W. Kenrick Minshall appeared.

The Town Clerk (Mr. Lawson Taylor) said the proposed new works would not supersede any of the present ones, with the exception of the switchboard. The total amount sanctioned for the undertaking was £41,856; and the capital outstanding was £31,397. A total of £10,459 had been repaid up to date, or was in the sinking fund.

The Inspector said he noticed that for the first seven years, from 1901 to 1906-7, £3353 was obtained out of the rates for the undertaking. From 1907, there had been profits totalling £1427. Out of the net profits, £293 had been paid for the relief of the rates; making the total indebtedness of the undertaking to the rates £3353, less £293. Why was the balance of the net profit put to the reserve fund, instead of being applied to the relief of the rates? They started very well in paying back to the relief of the rates, but had suddenly stopped.

The Town Clerk replied that the Inspector who conducted the last inquiry strongly advised them to have a reserve fund. In reply to further questions, he said that, as showing the growth of the demand for electricity, the total number of units consumed for private and street lighting had increased from 306,586 in 1903-4 to 646,883 in 1910-11. A refuse destructor was being worked in connection with the undertaking. The sum of £4145 now applied for was made up as follows: Expenditure in excess of loans previously sanctioned, £570; fitting of stores and offices, £350; extension of feeder and other pumps, £150; alteration to condenser, £95; electrical instruments, £60; forced-draught apparatus, £80; machinery, £250; coal-elevator, £300; automatic extension gear, £250; switchboard, £600; meters, £140; street lighting, £500; traction battery, £800. Of the amount asked for, £1445 had been expended,

The Borough Electrical Engineer (Mr. G. W. Pickvance), replying to questions by Mr. Hugh Jones as to the extension of the cables, said they had been extended from Wrexham Fechan to St. John's Church,

## GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 724.

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 1,551,868 | Stk. | Apl. 12 | 5 | Alliance & Dublin Ord. | 83—86 | .. | 5 16 3 |
| 374,000 | Stk. | Jan. 13 | 4 | Do. 4 p.c. Deb. | 95—97 | .. | 4 2 6 |
| 200,000 | 5 | May 12 | 7 | Bombay, Ltd. | 6¼—6⅜ | .. | 5 3 8 |
| 40,000 | 5 | ,, | 7 | Do. New, £4 paid | 5¼—5⅜ | .. | 4 17 5 |
| 50,000 | 10 | Feb. 24 | 15 | Bourne-mouth Gas & Water | B 10 p.c. | .. | 5 3 5 |
| 311,810 | 10 | ,, | 7 | | B 7 p.c. | .. | 4 3 7 |
| 75,000 | 10 | ,, | 6 | | Pref. 6 p.c. | .. | 4 0 0 |
| 380,000 | Stk. | ,, | 12½ | Brentford Consolidated | 257—262 | .. | 4 15 5 |
| 330,000 | ,, | ,, | 9½ | Do. New | 203—208 | +1 | 4 11 4 |
| 50,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | 122—124 | .. | 4 0 8 |
| 206,250 | ,, | Dec. 15 | 4 | Do. 4 p.c. Deb. | 99—101 | .. | 3 19 3 |
| 220,000 | Stk. | Mar. 10 | 11 | Brighton & Hove Orig. | 217—220 | .. | 5 0 0 |
| 246,320 | ,, | ,, | 8 | Do. A Ord. Stk. | 157—160 | .. | 5 0 0 |
| 490,000 | 20 | Apl. 12 | 11⅝ | British | 43¼—44½ | .. | 5 5 7 |
| 120,000 | Stk. | Dec. 30 | 4 | Do. 4 p.c. Deb. Stk. | 96—98 | .. | 4 1 8 |
| 109,000 | ,, | Feb. 10 | 6 | Bromley, A 5 p.c. | 116—118 | .. | 5 1 8 |
| 165,700 | ,, | ,, | 4½ | Do. B 3½ p.c. | 87—89 | .. | 5 1 2 |
| 82,278 | ,, | ,, | 5½ | Do. C 5 p.c. | 106—108 | .. | 5 1 10 |
| 55,000 | ,, | Dec. 30 | 3½ | Do. 3½ p.c. Deb. | 84—86 | .. | 4 1 5 |
| 250,000 | Stk. | ,, | 4 | Buenos Ayres 4 p.c. Deb. | 97—99 | .. | 4 0 10 |
| 100,000 | 10 | — | — | Cape Town & Dis., Ltd. | 3—4 | .. | — |
| 100,000 | 10 | — | — | Do. 4½ p.c. Pref. | 6—6½ | .. | — |
| 50,000 | 50 | Nov. 2 | 6 | Do. 6 p.c. 1st Mort. | — | .. | — |
| 100,000 | Stk. | Dec. 30 | 4½ | Do. 4½ p.c. Deb. Stk. | 88—90 | .. | 5 0 0 |
| 157,150 | Stk. | Feb. 24 | 5 | Chester 5 p.c. Ord. | 109—111 | .. | 4 10 1 |
| 1,513,280 | Stk. | ,, | 5/9/4 | Commercial 4 p.c. Stk. | 114—116 | .. | 4 14 3 |
| 560,000 | ,, | ,, | 5½ | Do. 3½ p.c. do. | 108—110 | .. | 4 16 11 |
| 475,000 | ,, | Dec. 15 | 3 | Do. 3 p.c. Deb. Stk. | 77—79 | .. | 3 15 11 |
| 800,000 | Stk. | May 31 | 4 | Continental Union, Ltd. | 93—95* | .. | 4 4 3 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 134—136* | .. | 5 2 11 |
| 492,270 | Stk. | — | 5½ | Derby Con. Stk. | 122—124 | .. | 4 8 9 |
| 55,000 | ,, | — | 4 | Do. Deb. Stk. | 104—105 | .. | 3 16 2 |
| 148,995 | ,, | Apl. 12 | 5 | East Hull 5 p.c. Ord. | — | .. | — |
| 840,150 | 10 | Jan. 27 | 10 | European, Ltd. | 19—20 | .. | 5 0 0 |
| 16,179,445 | Stk. | Feb. 24 | 4½ | Gas-light and Coke | 4 p.c. Ord. | 105½—106½ | +¼ | 4 7 7 |
| 2,600,000 | ,, | ,, | 3½ | | 3½ p.c. max. | 85—87 | .. | 4 0 6 |
| 4,062,235 | ,, | ,, | 4 | | 4 p.c. Con. Pref. | 103—105 | .. | 3 16 2 |
| 4,531,705 | ,, | Dec. 15 | 3 | | 3 p.c. Con. Deb. | 80—82 | .. | 3 13 2 |
| 258,740 | Stk. | Mar. 10 | 5 | Hastings & St. L. 3½ p.c. | | 95—97 | .. | 5 3 1 |
| 82,500 | ,, | ,, | 6½ | Do. do. 5 p.c. | | — | .. | — |
| 70,000 | 10 | Apl. 27 | 11 | Hongkong & China, Ltd. | | 17½—17⅝ | .. | 6 3 11 |
| 131,000 | Stk. | Mar. 10 | 7⅝ | Ilford A and C | | 146—149 | .. | 4 19 0 |
| 65,780 | ,, | ,, | 5⅝ | Do. B | | 117—120 | +2½ | 4 17 11 |
| 65,500 | ,, | Dec. 30 | 4 | Do. 4 p.c. Deb. | | 96—98 | .. | 4 1 8 |
| 4,940,000 | Stk. | May 12 | 9 | Imperial Continental | | 186—188 | .. | 4 15 9 |
| 1,235,000 | Stk. | Feb. 10 | 3½ | Do. 3½ p.c. Deb. Red. | | 92—94 | .. | 3 14 6 |
| 200,242 | Stk. | Mar. 10 | 6 | Lea Bridge Ord. 5 p.c. | | 119—121 | .. | 4 19 2 |
| 561,000 | Stk. | Feb. 24 | 10 | Liverpool United A | | 214—216 | .. | 4 12 7 |
| 718,100 | ,, | ,, | 7 | Do. B | | 163—165 | .. | 4 4 10 |
| 306,083 | ,, | Dec. 30 | 4 | Do. Deb. Stk. | | 102½—104½ | .. | 3 16 7 |
| 75,000 | 5 | Dec. 15 | 6 | Malta & Mediterranean | | 4⅜—5 | .. | 6 0 0 |
| 560,000 | 100 | Apl. 1 | 5 | Met. of 5 p.c. Deb. | | 100—102 | .. | 4 18 0 |
| 250,000 | 100 | ,, | 4½ | Melbourne 4½ p.c. Deb. | | 100—102 | .. | 4 8 3 |
| 541,920 | 20 | May 31 | 3½ | Monte Video, Ltd. | | 12⅜—13¼ | .. | 5 5 8 |
| 1,775,892 | Stk. | Feb. 24 | 4½ | Newc'tle&G'tesh'd Con. | | 103—104 | +½ | 4 4 2 |
| 529,705 | Stk. | Dec. 30 | 3½ | Do. 3½ p.c. Deb. | | 89—90 | .. | 3 17 9 |
| 55,940 | 10 | Mar. 10 | 7 | North Middlesex 7 p.c. | | 15—16 | +½ | 4 7 6 |
| 300,000 | Stk. | Apl. 27 | 8 | Oriental, Ltd. | | 137—139 | .. | 5 15 1 |
| 60,000 | 5 | Apl. 12 | 8 | Ottoman, Ltd. | | 6⅜—7¼ | .. | 5 10 4 |
| 31,800 | 53 | Feb. 24 | 13 | Portsea Island A | | 135—140 | .. | 4 18 4 |
| 60,000 | 50 | ,, | 13 | Do. B | | — | .. | — |
| 100,000 | 50 | ,, | 12 | Do. C | | 120—125 | .. | 4 16 0 |
| 114,800 | 50 | ,, | 10 | Do. D and E. | | — | .. | — |
| 398,490 | 5 | May 31 | 8 | Primitiva Ord. | | 7⅞—7¾* | —⅛ | 5 3 3 |
| 796,980 | 5 | Dec. 30 | 5 | Do. 5 p.c. Pref. | | 5⅛—5⅜ | .. | 4 8 11 |
| 488,900 | 100 | June 1 | 4 | Do. 4 p.c. Deb. | | 97—99* | .. | 4 0 10 |
| 312,650 | Stk. | Dec. 30 | 4 | River Plate 4 p.c. Deb. | | 97—99 | .. | 4 0 10 |
| 250,000 | 10 | Mar. 24 | 9 | San Paulo, Ltd. | | 20—21 | +⅛ | 4 5 9 |
| 115,000 | 10 | ,, | 6 | Do. 6 p.c. Pref. | | 12—12½ | .. | 4 16 0 |
| 125,000 | 50 | Jan. 3 | 5 | Do. 5 p.c. Deb. | | 50—51 | .. | 4 18 0 |
| 135,000 | Stk. | Mar. 24 | 10 | Sheffield A | | 235—237 | .. | 4 4 5 |
| 209,984 | ,, | ,, | 10 | Do. B | | 235—237 | .. | 4 4 5 |
| 523,500 | ,, | ,, | 10 | Do. C | | 234—236 | .. | 4 4 9 |
| 70,000 | 10 | Oct. 14 | 7† | South African | | 9—10 | .. | 6 0 0 |
| 6,429,895 | Stk. | Feb. 10 | 5/9/4 | South Met., 4 p.c. Ord. | | 119—121 | .. | 4 10 3 |
| 1,895,445 | ,, | Jan. 13 | 3 | Do. 3 p.c. Deb. | | 80—82 | .. | 3 13 2 |
| 209,820 | Stk. | Mar. 10 | 8 | South Shields Con. Stk. | | 154—156 | .. | 5 2 7 |
| 605,000 | Stk. | Feb. 24 | 5⅝ | S'th Suburb'n Ord. 5 p.c. | | 119—121 | .. | 4 13 6 |
| 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | | 118—120 | .. | 4 3 4 |
| 117,058 | ,, | Jan. 13 | 5 | Do. 5 p.c. Deb. Stk. | | 123—125 | .. | 4 0 0 |
| 502,310 | Stk. | May 12 | 5 | Southampton Ord. | | 109—111 | .. | 4 6 11 |
| 120,000 | Stk. | Feb. 10 | 7 | Tottenham and B 3½ p.c. | A 5 p.c. | 147—150 | .. | 4 13 4 |
| 483,940 | ,, | ,, | 5½ | | | 116½—118½ | .. | 4 12 10 |
| 149,470 | ,, | Dec. 15 | 4 | Edmonton | 4 p.c. Deb. | 98—100 | .. | 4 0 0 |
| 182,380 | 10 | Dec. 30 | 8 | Tuscan, Ltd. | | 9—9½ | .. | 8 8 6 |
| 149,900 | 10 | Jan. 3 | 5 | Do. 5 p.c. Deb. Red. | | 98—100 | .. | 5 0 0 |
| 236,476 | Stk. | Feb. 24 | 5 | Tynemouth, 5 p.c. max. | | 115—117 | .. | 4 5 6 |
| 255,636 | Stk. | Feb. 24 | 6½ | Wands-worth | B 3½ p.c. | 141—143 | .. | 4 14 5 |
| 85,766 | ,, | Dec. 30 | 3 | | 3 p.c. Deb. Stk. | 73—75 | .. | 4 5 6 |

Prices marked * are "Ex. div." † Next dividend will be at this rate.

a distance of 500 yards, at a cost of £220; and there was only one private consumer. The mains had also been extended down Derby Road and Green Bank Street, where there were no private consumers. The cost of laying the cables in this district was £257. There was one private consumer paying £6 a year; and they had also connected a large number of public lamps—the total revenue being about £50. The gas-lamps had been superseded. The cable had been extended along Ruabon Road, a distance of 275 yards; and there was only one consumer. But the Corporation hoped to get many customers when an estate in the district was developed. He was also examined with reference to other extensions that had been made, and in each of which cases the gas-lamps in the streets had been superseded by electric lights. Some 2229 yards of cable had been laid for six private consumers; but the extensions were made principally for public lighting. He admitted that it was proposed to lay cables in some of the poorer quarters of the town; but the work could be done cheaply, and it would pay very well for public lighting. He knew that in Wrexham gas was 2s. per 1000 feet for public lighting, and 2s. 3d. for private lighting, and that there were very few places where it was so cheap. The cost of street lighting had gone up tremendously since they had introduced electricity; but they had a considerable increase in light, and a much more satisfactory light into the bargain. Compared with ten years ago, the cost of public lighting had increased by £400 or £500; but Wrexham had progressed, and the old system of gas lighting would not suit the town in these days. He was further examined with the object of showing that the cost of maintaining the electric lamps was greater than that of the gas-lamps.

Answering the Town Clerk, Mr. Pickvance said that, with reference to the length of the main in Salop Road, which had one private consumer on it, the capital expenditure was only £49, and the one consumer had paid up to date £250. The lighting of side streets would be done by a small cable; and after reckoning the cost of maintenance and everything else, there would be a saving of 14s. per lamp per year as compared with gas.

Addressing the Inspector, Mr. Hugh Jones said he represented the Gas Company, whose ratable value was £2081 per annum, and the Water Company, whose ratable value was £1175. They knew the electric light had come to stay; and the Gas Company did not oppose the application merely because they were competitors. What they objected to was that they should be rated to maintain a concern which was going ahead too fast. There was a headstrong forward policy in connection with the undertaking, which was landing the borough in prematurely heavy charges on capital and sinking funds. In this case, the mains had been laid for public lighting without any private consumption to justify it; and he would point out that one Local Government Board Inspector told a certain corporation that their electricity undertaking had failed because they were laying cables where there were no consumers. There were many lengths of barren cables in Wrexham. It was all very well to suggest that it was profitable to do it for public lighting; but the Engineer had compared 50-candle power electric lamps with 150-candle power gas-lamps. The gas-lamps worked out at £2 17s. 6d. per lamp, and the electric lamps at £3 3s., in addition to which the cleaning, &c., of a gas-lamp cost 2s. less. He would suggest that it was improper for the Corporation to ask for sanction to a scheme when one-third of it had been carried out. The only hope of putting the concern on a sound financial basis was that the Local Government Board would insist on a rigid adherence to a distinction being made between capital and revenue, and make sure that items were really in the nature of capital expenditure, and not merely renewals for accidents and disappearance of capital which ought to fall upon revenue. He would ask the Inspector to bear in mind that £800 had been made in profits from fittings, &c., which had been held by the Attorney-General as business upon which municipal corporations could not embark.

The Town Clerk, in reply, said the policy of the Corporation was not headstrong, but a careful and deliberate one; each extension being decided upon after the fullest information and consideration.

Mr. Pickvance remarked the 50-candle power lamps compared very favourably with the so-called 140-candle power gas-lamps. He had never seen any such gas-lamps in Wrexham.

## BAHIA BLANCA GAS COMPANY, LIMITED.

Presiding at the fourth ordinary general meeting of the Bahia Blanca Gas Company, Limited (the report of the Directors of which was noticed in last week's "JOURNAL," p. 684), last Thursday, the Chairman, Mr. J. C. im Thurn, said the profit for the year to Dec. 31 amounted to £2764, which, together with £924 brought forward from 1909, gave a total available of £3688, out of which the Directors recommended the payment of a dividend of 2 per cent. for the year on the "A" shares, free of income-tax—absorbing £3000, and leaving to carry forward £688. The shareholders would notice that the property account had been increased by £6642, which was chiefly due to necessary extensions of the retorts, and to several small extensions of mains and new meters. Stocks of coal and general stores had been kept up, and stood at £32,468; being a small increase over the previous year. Sundry debtors, £5000, showed an increase of £1967, due to the difficulty of getting accounts for gas and residuals paid. On the other side, sundry creditors, £19,088, was composed chiefly of loans, as the Company had at present no working capital, and various trading accounts, all of which latter had since been paid. That the profit for the past year should be less than that of 1909 was a matter of regret to the Board; but it was due to circumstances absolutely beyond control. At the time they held their last meeting a year ago, reports and advices had come to hand that the drought which then existed had been followed by plentiful rains; but unfortunately in the latter part of the year drought again set in, and the whole of the southern portion of the Republic, in which Bahia Blanca was situated, became


# HOT WATER FROM THE "SUN."

**The "Sun" Gas-Heated Automatic Boiler.**

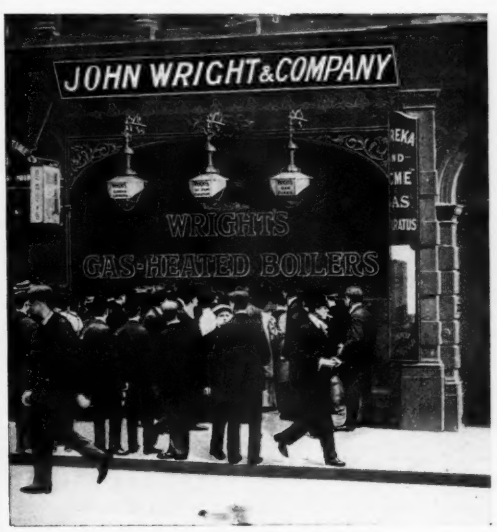
**The Patent Automatic Gas Valve** fitted to the "SUN" Boiler controls the apparatus, and ensures that not a foot of gas is used beyond what is actually needed to maintain the water at the right temperature.

**Simple, Certain, Rapid**

in its action, this Valve exercises greater vigilance over the gas supply than is possible with the most watchful and economical of human attendants. The exceptional economy of gas consumption thus effected, combined with the general efficiency of the apparatus, has resulted in the "SUN" being widely adopted in all classes of households as well as in schools, public institutions, &c., throughout the country.

JOHN WRIGHT & CO., BIRMINGHAM.

276




THIS PHOTOGRAPH shows the attention attracted by the "SUN" Boiler, with its Patent Automatic Gas Valve, in our Showroom window at 19 and 21, Queen Victoria Street, London, E.C.

There is an all-day, once-a-minute demonstration of the Thermostat in operation in this window which is both instructive and interesting.

IT IS WORTH A JOURNEY TO SEE THIS.

seriously impoverished, and business was at a standstill in many directions. The failure of the crops in a purely agricultural country meant general and widespread distress, affecting all business interests disastrously. Three years in succession of intense drought naturally had a serious effect upon the general business of the Company, and had rendered the recovery of outstanding accounts extremely difficult. Notwithstanding all these adverse conditions—the closing of many business houses in the city that were consumers, and the impoverishment of others—the Company had held their own, and were able to pay a small dividend. This had been rendered possible only by rigid economy in every direction, and by the closest attention having been paid to the collection of accounts, and the avoidance of bad debts as far as possible. The results would have been better had not the poor state of the crops greatly increased outward freights—due to there being little cargo homewards. The item of freight, combined with higher cost of coal, had meant an increase of no less than £1746 during the year. The total length of the mains laid was now just over 41 miles; being an increase of about 1 mile in the past year. Permission had been obtained from the Municipality to erect a trial installation of high-pressure gas-lamps on the central plaza of the town, to demonstrate what could be done in the way of large units of light. It was hoped that this would enable the Company to undertake a larger measure of public lighting than they had at present. Bahia Blanca being a very dusty city, had led the Manager to institute a series of experiments on the use of tar for roads; and from the latest advices to hand, it was hoped that his efforts would be successful. At the last meeting, he mentioned that the works were perfectly equipped, and that the wishes of the consumers were being studied in every direction. This was equally true to-day; but against the disastrous results of a general drought, the efforts of the Board had been of little avail. On account of ill-health, Mr. P. L. G. Bridger, the Manager, had resigned his position; and in his place the Directors had appointed Mr. A. M. Hunter, who was the Engineer to the Company under the late Manager. The Board had the greatest confidence in Mr. Hunter, who was exercising a very close watch over expenditure. The Secretary (Mr. W. Upton) paid a visit to the works in December, and carefully examined the whole position (both of the Company and generally). He reported that, notwithstanding the bad state of business at present, there was no doubt that when the agricultural conditions recovered from their existing unfortunate position, the progress would be very rapid. In reply to a cable, the Manager informed them that the rainfall was sufficient for the crops up to the present, and that no more would be required until September, when, if it rained again, excellent crops were expected. He (the Chairman) hoped that the very prolonged drought had broken up. When this happened, he believed their prospects would rapidly improve.

The report was adopted, the dividend recommended was declared, and the retiring Director and the Auditors were re-elected. The proceedings terminated with a vote of thanks to the Chairman, who, in acknowledgment, remarked that it was very bad luck that, just after starting this enterprise, they should experience three years of drought.

## THORIUM PRICE-MAINTENANCE SCHEME.

The following, on the subject of the collapse of the thorium price-maintenance scheme, appeared in the "Financial Times" last Thursday.

After protracted negotiations, the "Berliner Tageblatt" learns, failure is the only result of the endeavours made to bring about among the European manufacturers of thorium an improvement in the market and an increase in prices. The prices of nitrate of thorium, which is a necessary raw material for the manufacture of incandescent gas-mantles, have shown a backward tendency for years past, and have reached the lowest level this year. The cause of the fall in prices is to be found in the obstinate contest between a French works, an Austrian factory, and the German manufacturers combined under the title of the Thorium Convention. The contest was produced through over-production of monazite sand, from which thorium is made. Formerly, only a few manufacturers were able to obtain supplies of monazite sand; but with the lapse of time, a Hamburg firm and a Paris firm imported large quantities of the material into Europe and threw it on the market. An attempt was then made to put an end for some time to the over-production of monazite sand, and to obtain better prices, by the distribution of the production of nitrate of thorium among the various interested manufacturers. Success attended the efforts to divide the production of thorium; but it was not possible to restrict the over-production of monazite sand or the quantity in the market, so that the idea of maintaining prices for a long time could not be entertained. It has, moreover, been announced from Brazil that the Government intends in the near future to proceed to let a fresh lease of the State monazite lands, whereby a further inundation of Europe with monazite sand is to be expected.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

It is likely that the meeting of the Waverley Association of Gas Managers, which was held in Edinburgh yesterday, suffered from its proximity to the meeting of the Institution of Gas Engineers in Glasgow next week—at least, in so far as attendance was concerned. The address of the President—Mr. R. W. Cowie, of Dalkeith—was decidedly above the average in interest. His remarks with reference to the gas supply to Dalkeith Palace, taken in conjunction with those by Mr. T. Black, of Coldstream, bring home the pleasant information that in the higher walks of society gas is still the favourite medium for lighting. If the Duke of Buccleuch and the Earl of Home had been carried away by sentiment, an itching for change which is frequently mistaken for, and termed, progress, they would both have had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their principal country establishments lighted by electricity. Though their adoption of electric lighting would have been a good advertisement for this light, they themselves, when in the country, would not be advertised by having electric light in their homes, and so they, looking to comfort and efficiency, have stuck to gas. The difficulties encountered in the lighting of such large establishments, which are always at a distance from the gas-works, were brought forward by both speakers; and their method of overcoming these difficulties—the same in both instances—is another and most convincing testimony to the very great advantage which high-pressure gas supply is to the industry. Perhaps the part of the President's address which will receive most attention was that in which he told of the discovery of a very large deposit of ammonium chloride in the hydraulic main. There was a disappointing lack in the President's remarks of an estimate of the quantity of the salt which was discovered, and also of the length of time the hydraulic main had been in use. If the quantity had been stated, even approximately, it would have been possible, in considering the source from which the salt was derived, to have shut out certain theories, such as the derivation of it from the glaze upon the interior of the retorts; and by a process of exclusion, who knows but that the real source might yet be discovered. Mr. Cowie has been about two years in Dalkeith, and knows what has been going through since then; but if the hydraulic main has been unopened since before that time, we cannot say what the late Mr. Bell may have been doing in the way of experimenting. A pertinent question in this connection would be as to the greatest possible quantity of such salt as was found which is contained in gas; and another question, equally as pertinent, is as to the temperature at which the salt would crystallize in the circumstances. Considerations such as these are worthy of attention for the elucidation of what looks mysterious at present, but which will very probably, if a conclusive explanation be forthcoming, be found to be a very simple affair after all.

It will be observed, from a report in another column of the remarks of Treasurer Soutar, of Dundee, that it is proposed to employ ladies holding diplomas in cooking to instruct consumers in the use of gas cooking-stoves. The proposal indicates that the process of education of the public, desiderated by Mr. O'Connor, is about to be put in practice in Dundee.

It is difficult to understand some movements on the part of corporations except the view be entertained that they are dictated by envy on the part of chief officials, every one of whom likes to have as large an annual turnover as possible. This reflection is brought up by the recommendation of the Lighting Committee of the Peterhead Town Council that the mantles, glasses, and chimneys for the public lamps be purchased by the Committee direct from the makers, instead of through the Gas Department. The Council unanimously adopted the recommendation. The Gas Manager—Mr. W. Ritchie—submitted his recommendations with reference to the purchase of coal for the current year. Adopting them, the Council entered into contracts for 5500 tons, at the price of £2697. The price is 9·9d. per ton less than that agreed to a year ago.

At the Newport Town Council on Monday, it was reported that there had been an increase during the year of 1,690,700 cubic feet in the quantity of gas made, which was equal to 7½ per cent. In 1901-02, when the gas undertaking became the property of the Corporation, the output of gas was 11,839,100 cubic feet; last year, it was 24,097,200 cubic feet—an increase of 12,268,100 cubic feet—equal to fully 103 per cent. There are now 371 gas-cookers in use—an increase of 48 during the year, and of 360 since 1901. It was reported that gas-fires are now also being largely taken advantage of.

The Cambuslang Gas Company, Limited, had a net profit last year of £2832. From this sum, £1795 has been set aside for payment of a final dividend at the rate of 6 per cent.; making 10 per cent. for the year. At the annual meeting a sum of £550 was carried to depreciation account, £200 to reserve, and the balance of £287 carried forward.

The Dalbeattie Gas Company, Limited, have paid a dividend of 7½ per cent., as compared with 5 per cent. last year.

There is every reason to expect that the difficulty which has been experienced with reference to the Glenquey reservoir, from which a large district in the western division of Fifeshire, including the Naval works at Rosyth, is to be supplied with water, is about to be overcome. Mr. Jas. Watson, the Water Engineer at Bradford, has examined the reservoir; and his report was laid before the Dunfermline District Committee of the Fife County Council last Tuesday. Mr. Watson's report was to the effect that the embankment of the reservoir was stable and sound, but that immediately at the end of the puddle trench the rock dipped down to the north, and rose again rapidly, forming a V-shaped channel about 100 feet in depth, the line of an ancient watercourse, along which water gets past the end of the embankment. He recommended that the embankment be extended northwards another 180 feet, carried down to the rock at the apex of the V, and tied into the rock at each side. The Committee agreed to have the work done as recommended, the cost to be borne by the Committee, the Admiralty, and the burgh of Inverkeithing. This having been resolved upon, the Committee also agreed to pay Messrs. James Young, Limited, of Glasgow, the balance of the contract price for the construction of the reservoir, amounting to £9380, which they were holding back pending the satisfactory completion of the reservoir; the Committee being now satisfied that Messrs. Young have satisfactorily completed their contract.

**Hebden Bridge and Mytholmroyd Gas Board.**—Presenting to the Hebden Bridge and Mytholmroyd Gas Board his annual report, the Manager (Mr. E. J. Wellens) stated that the total amount of gas manufactured during the past year had been 93,672,000 cubic feet, compared with 89,487,000 cubic feet in the previous year. The working results he considered were satisfactory. The gas made per ton was better; and the illuminating power had been of a higher average standard. Coke sold showed an increase of 100 tons; tar, of 25 tons; and liquor, of 11 tons. The total gas manufactured increased by 4,185,000 cubic feet, and the sales by 4,137,000 cubic feet. Coal had cost £46 more, owing to the advance in contract prices.

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## CURRENT SALES OF GAS PRODUCTS.

[For Table of "Tar Products Prices," see p. 762.]

LIVERPOOL, *June* 10.

**Sulphate of Ammonia.**

A holiday feeling has pervaded the market more or less during the whole week, and business has in consequence been somewhat restricted. Fresh supplies coming out for sale have, however, not been abundant, and this fact has no doubt helped to prevent any substantial decline in values, although prices have again given way to a small extent. The closing quotations are £12 15s. to £12 16s. 3d. per ton f.o.b. Hull, £12 16s. 3d. to £12 17s. 6d. per ton f.o.b. Liverpool, and £12 17s. 6d. to £12 18s. 9d. per ton f.o.b. Leith. In the forward position, a fair inquiry has again been experienced, but not much business on the part of manufacturers has transpired. It is reported, however, that some makers have taken orders for delivery during the second half of the year at the equivalent of about £13 per ton at the ports.

**Nitrate of Soda.**

This article continues scarce on spot, and quotations have again been advanced to 10s. 1½d. per cwt. for ordinary and 10s. 4½d. for refined quality.

LONDON, *June* 12.

**Tar Products.**

The markets for tar products still remain fairly firm. There has been a little more inquiry for pitch for near and forward delivery, and fairly high prices are being asked for forward delivery. Benzols are very quiet. There is not much business doing in solvent naphtha. Heavy naphtha is in good demand, and fair prices are being paid. Crude carbolic is very firm. Creosote is steady, and there has been a little more inquiry for near delivery, and in some quarters improved prices have been paid.

The average values during the week were: Tar, 18s. to 22s., *ex* works. Pitch, London, 36s. 6d. to 37s.; east coast, 36s. to 36s. 6d.; west coast, Manchester, 35s. 6d. to 36s., Liverpool, 36s. to 36s. 6d., Glasgow 36s. to 36s. 3d., f.a.s. Benzol, 90 per cent., casks included, London, 9d. to 9⅛d.; North, 9d.; 50-90 per cent., casks included, London, 8⅝d. to 9¼d.; North, 8½d. to 9d. Toluol, casks included, London, 9¼d. to 10d.; North, 9⅛d. to 9⅜d. Crude naphtha, in bulk, London, 4d. to 4½d.; North, 3⅛d. to 3½d.; solvent naphtha, casks included, London, 11d. to 11⅜d.; North, 10d. to 10⅛d.; heavy naphtha, casks included, London, 11⅛d. to 1s. 0⅛d.; North, 10d. to 10⅛d. Creosote, in bulk, London, 2¼d. to 2⅜d.; North, 1⅞d. to 2d. Heavy oils, in bulk, 2⅜d. Carbolic acid, 60 per cent., casks included, east coast, 1s. 9d. to 1s. 9¼d.; west coast, 1s. 8d. to 1s. 9d. Naphthalene, £4 10s. to £8 10s.; salts, 40s. to 42s. 6d., bags included. Anthracene, "A" quality, 1½d. to 2d. per unit, packages included and delivered.

**Sulphate of Ammonia.**

There has been a little more inquiry for this article during the past week. Actual Beckton is quoted £12 12s. 6d.; outside London makes, £12 7s. 6d.; Hull, £12 17s. 6d. to £12 18s. 9d.; and Liverpool, £12 18s. 9d. In Leith, £13 to £13 2s. 6d., and for forward £13 5s., is asked; and in Middlesbrough, £12 17s. 6d.

## COAL TRADE REPORTS.

**Northern Coal Trade.**

There is a steady demand in the coal trade of the North; but the supply is ample so far as steam coals are concerned. Best Northumbrian steams are from 10s. 7d. to 10s. 9d. per ton f.o.b.; second-class steams are from 9s. 3d. to 9s. 9d.; and steam smalls are less scarce at from 5s. to 6s. The coming holidays may limit the output and stiffen the market; but at present all kinds of steam coal seem inclined to ease in price. In the gas coal trade, on the contrary, the demand fully takes up the production, and there is a heavy export; so that the prices are firm, especially for best sorts. Second-class gas coals are quoted from 9s. 4½d. to 9s. 6d. per ton f.o.b.; best Durham are from 10s. 1½d. to 10s. 3d.; and special "Wear" qualities are now from 10s. 9d. to 11s. Some small contracts for gas coals are in the market, and there are offers equal to about 9s. 6d. per ton f.o.b. for second-class gas coals, over next year. But the expected additional cost of production through any legislative changes makes the coalowners less disposed to sell forward, unless at some increase of the price. Coke is quiet. Gas coke is much less in production; so that the price is firm at about 14s. to 14s. 3d. per ton f.o.b. in the Tyne or Wear.

**Scotch Coal Trade.**

The coal market is not in a healthy condition. As the financial year in collieries comes to an end, it is possible to gauge the effect which recent legislation has had upon the industry of coal production; and the general conclusion is that the effect is more burdensome and more far-reaching than many had begun to believe it would be. Even such a prosperous Company as the Niddrie and Benhar announce that they are unable to pay dividend this year. The market is exceedingly flat, and there is, unfortunately, nothing in sight which would give reason for anticipating an improvement. The prices now quoted are: Ell, 8s. 6d. to 9s. 6d. per ton f.o.b. Glasgow; splint, 9s. to 9s. 3d.; and steam, 8s. 6d. to 8s. 9d. The shipments for the week amounted to 321,982 tons—an increase of 305 tons upon the preceding week, but a decrease of 37,607 tons upon the corresponding week last year. For the year to date, the total shipments have been 6,575,459 tons—a decrease upon the corresponding period of 54,748 tons.


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## A Good Surplus at Bradford.

The balance-sheet submitted last week by the Deputy City Treasurer (Mr. F. O. Whiteley) to the Bradford Corporation Gas Committee showed that the profits for the past financial year amount to £12,935, compared with a deficit for the previous year of £737. This good result has been obtained owing to an increased income of £4798 from the sale of gas, and large increases in profits on bye-products. The year's income is £309,473, an increase of £22,520. The amount received from the sale of coke is £39,261, an increase of £6566; from tar, £13,571, an increase of £2405; and from ammoniacal liquor, £20,455, an increase of £3629. There has also been a profit of £3621 from the sale of chemicals. The expenditure upon the manufacture of gas amounted to £170,631, or £3969 more than the previous year; and of the former amount, £108,805 was in respect of coal. Distribution has cost less by £646; the figure for the year being £9961. The sum of £14,703—an increase of £445—has been paid in rates and taxes. The income from the manufacture of chemicals was £32,685. The gross profits amount to £72,497, of which £59,562 is absorbed by interest and sinking fund charges, leaving a net profit of £12,935.

## A Burst Main at Saltley.

Inconvenience was caused in the Lower Saltley district of Birmingham last Thursday, by the bursting of a water-main and the consequent flooding of a gas-main. The first intimation that something was wrong, it is said, came about noon, when consumers found their gas-pipes the vehicle of water instead of gas. The basement of the Coliseum became flooded; and the Manager telephoned to the Gas Department asking for assistance, which was soon forthcoming. It was surmised that a water-main had burst; and the water, finding an entry into a broken gas-main, had flooded the service system. This main supplied a thickly-populated area immediately around the Coliseum. The officials promised an early reinstatement of the gas supply (which had had to be cut off), and set about to ascertain the spot at which the water had broken into the gas system. This necessitated excavations at many points. The Coliseum is lighted throughout by gas and electricity; the current being obtained from generators worked by a gas-engine deriving its supply from the Corporation mains; and neither the gas nor the water for the cooling jackets was available. The performance should have commenced at 6.30; but as it was apparent that the services could not be restored in time, the Manager had to announce there would be no early performance. Before 9 o'clock, however, the gas supply had been restored; while the difficulty of furnishing water for cooling the engine cylinders was overcome by the Gas Department employing workmen to carry water to the theatre in buckets from a large well on the adjoining works.

## Nottingham Corporation Water Department.

The Water Committee of the Nottingham Corporation have issued their report for the year ended the 31st of March last. They state that, in view of the fact that an annual payment, estimated at from £20,000 to £25,000, in connection with the Derwent Valley water scheme, becomes due on the 1st of January next, the past year's work and financial results have demanded the greatest care and consideration. The net profits of the water undertaking have risen from £7317 in 1905 to £14,360. The Committee point out that provision for the necessary annual payment to the Derwent Valley Water Board could be made in three ways: (1) By an increase in the profits of the water undertaking by economy of working under existing rates of charge. (2) By an increase in the water charges to all consumers, to the extent available under the present powers, or by an Act of Parliament if the existing powers proved insufficient. (3) By including an item in the estimate for the district rate. The Committee foreshadowed in last year's report their intention to attempt the first-mentioned method; and though it was recognized that the necessary deficit could not be bridged in one year, they are pleased to report such satisfactory progress as to assume that, by temporarily drawing on the unexpended profits, or rest fund, there is every probability that the ratepayers may be saved from any increase of the rates to meet a deficiency on the undertaking. The net result of the past year's working shows a profit of £21,122, which has been carried to the rest fund, now amounting to £94,106. If the anticipated further natural increase of profits takes place during the current year, the Committee say there would appear to be little doubt that the obligations falling due on the 1st of January next can be met out of current income without difficulty. The increase in the profits is due principally to three causes: (1) Economies in working expenses effected by the Engineer. (2) Reorganization of the assessment department. (3) Adjustment to the scale (fixed by the Committee in 1880) of the charges for water supplied by meter.

**Reductions in Price at Bury and Oldham.**—The recommendation of the Bury Corporation Gas Committee that the price of gas to ordinary consumers be reduced by 1d. per 1000 cubic feet has been approved by the Council, as well as the suggestion that consumers by automatic meters be allowed one foot more of gas for the penny. For the past financial year, the receipts in the Gas Department exceeded those of the previous year by £2938, and the net profit for appropriation was increased by £559; making a total of £7710. The net price of gas for the ensuing year will be 1s. 11d. per 1000 cubic feet. At their meeting on Wednesday last, the Gas Committee of the Oldham Corporation, on the recommendation of Mr. A. Andrew, the General Manager, decided to reduce the price of gas 1d. per 1000 cubic feet to all consumers, except those using automatic meters. Mr. Andrew explained that he did not think a larger reduction in price was wise in view of the abnormal call there would be on the reserve fund due to renewals. The price hitherto has ranged from 2s. 2½d. per 1000 cubic feet where the consumption was 5,000,000 cubic feet per quarter and over to 2s. 6d. where the quarterly consumption was 100,000 cubic feet or under; a discount of 6d. in the pound being allowed. During last year, the Department made a profit of £23,574; and after deducting £7500 handed over in relief of rates and deducting £6700 paid out of the reserve fund, there was an approximate balance of £9400.


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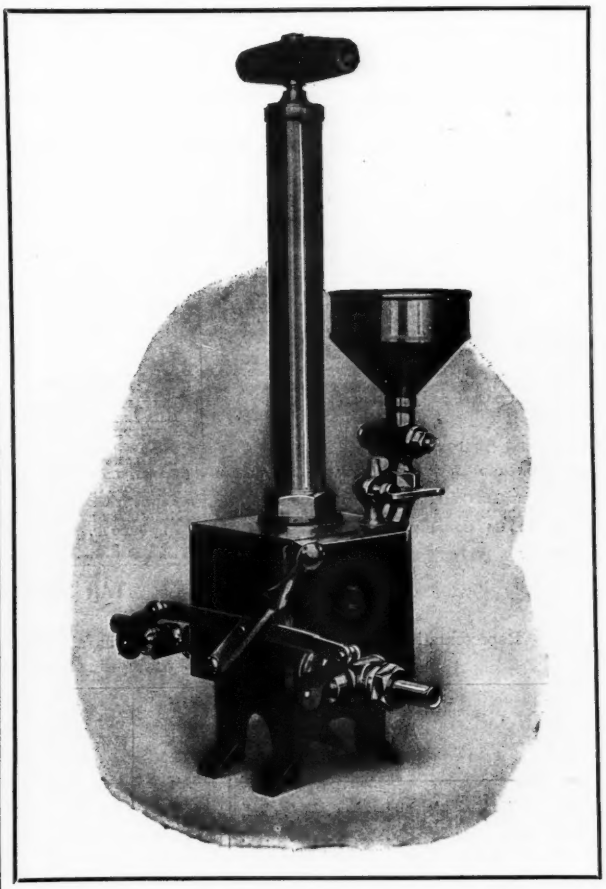

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**Reduction in Price at Downham.**—The Directors of the Downham Gas Company have intimated that the price of gas will be reduced, on the 30th inst., from 4s. 5d. to 4s. 2d. per 1000 cubic feet to ordinary consumers, and from 4s. to 3s. 9d. to users for motive power.

**Record Year at Carlisle.**—The gross profit of the Carlisle Corporation Gas-Works for the past financial year has, subject to audit, been given as £14,020; while the net profit amounts to £8695. This is £1000 more than in the previous record year of 1905, when the gross profits were £13,054.

**Finding a Gas Escape with a Light.**—Mr. George Thorpe, of Northfields, Dewsbury, received some injuries as the result of a gas explosion, caused by his seeking for the source of an escape with the aid of a light. A neighbour who had been absent from home found on her return a strong smell of gas in her house. She thereupon sought the assistance of Mr. Thorpe, who opened the windows, and, after turning the gas off at the meter, went round the house with a light, but could not find the escape. He returned to the cellar; and, after turning on the gas, he again searched with a light. Mounting a chair in the front room, he applied the light to the top of the chandelier; and immediately there was a loud report. He was lifted off the chair by the force of the explosion, and thrown on his side against the fireplace; his hurts being subsequently attended to at the infirmary.

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For the purpose of advancing illumination on Coronation Day, the Shanklin Gas Company have offered a free supply of gas to the residents.

The United Chemical Works, Limited, have removed to more central premises at No. 9, Farringdon Road, E.C., and all communications should now be addressed there.

The Directors of the Tuscan Gas Company have declared an interim dividend at the rate of 5 per cent. per annum (5s. per share) less income-tax.

In connection with the extensions at the Marple Gas-Works, two contracts have been accepted by the Urban District Council—viz, that of Mr. W. Chadwick, of Marple, for the erection of additional buildings, £1190; and that of Drakes Limited, of Halifax, for engineering work, £2948.

The report of Tubes Limited, showing the position of the Company on April 30, sets forth that the net profit amounts to £6584, to which must be added £7543 brought forward; making a total of £14,127. The Directors propose to pay a dividend of 1s. per share (less tax), and to carry forward £9418.

It was reported at last Wednesday's meeting of the Rochdale Corporation Gas Committee that there had been a fire at the gas-works coal-stores, due to spontaneous combustion. Damage estimated at about £100 was done before the flames were extinguished. A similar outbreak five or six years ago ended much more disastrously.

One of the mains conveying water from Lake Vyrnwy to Liverpool burst in a field at Cote Brook, a village about 8 miles from Northwich, last Wednesday. It was a 42-inch main, and was laid at a depth of about 12 feet; and its bursting was fortunately unattended by personal injury. Such an occurrence automatically closes the valves at the reservoir adjacent, with the result that only the water which is passing through the main is lost, and only the length between the two reservoirs—in this case, Cote Brook and Norton—is cut off. Some two or three million gallons of water escaped by reason of the burst, and rushed down a steep lane, tearing up the roadway for a quarter-of-a-mile.

## WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

### Situations Vacant.

TEACHER OF GAS MANUFACTURE. London County Council. Applications by June 26.
TAR-WORKS FOREMAN. No. 5415.
TEACHER OF GAS SUPPLY. Enfield Technical Institute. Applications by June 24.

### Plant, &c. (Second-Hand), For Sale.

METERS. Gaslight and Coke Company, London.
PURIFIERS, WASHER AND ENGINE, SCRUBBERS, &c. Cambridge Gaslight Company.

### Stocks and Shares.

BRIGHTON AND HOVE GAS COMPANY. By Auction. July 4.
EAST HULL GAS COMPANY. By Tender. June 27.
NORTH MIDDLESEX GAS COMPANY. By Auction. July 4.
SOUTHGATE GAS COMPANY. By Auction. July 4.

### TENDERS FOR

#### Acid, &c.

CHORLEY GAS DEPARTMENT. Tenders by June 20.

#### Benzol.

ILFRACOMBE GAS COMPANY. Tenders by June 22.

#### Coal and Cannel.

BELFAST GAS DEPARTMENT. Tenders by June 15.
EAST RETFORD GAS DEPARTMENT. Tenders by June 30.
EXMOUTH GAS COMPANY. Tenders by June 30.
HEYWOOD GAS DEPARTMENT. Tenders by June 17.
ILFRACOMBE GAS COMPANY. Tenders by June 22.
MANSFIELD GAS DEPARTMENT. Tenders by June 27.
MONTROSE GASLIGHT COMPANY. Tenders by June 26.
NEWBURY GAS DEPARTMENT. Tenders by June 17.
NEWCASTLE-UNDER-LYME GAS DEPARTMENT. Tenders by June 19.

#### Coal and Cannel (*continued*)—

NEW MILLS URBAN DISTRICT COUNCIL. Tenders by June 19.
NEWPORT (MON.) GAS COMPANY. Tenders by June 28.
SUNBURY GAS COMPANY. Tenders by June 29.
WAKEFIELD GASLIGHT COMPANY. Tenders by June 27.

#### Cookers and Stoves.

BELFAST GAS DEPARTMENT. Tenders by June 15.

#### Lime.

MANSFIELD GAS DEPARTMENT. Tenders by June 27.

#### Tar and Liquor.

BRIDGEWATER COLLIERIES COKE WORKS. Tenders by June 20.
MANSFIELD GAS DEPARTMENT. Tenders by June 27.
NEWCASTLE-UNDER-LYME GAS DEPARTMENT. Tenders by June 19.
READING GAS COMPANY. Tenders by June 19.

## TAR PRODUCTS PRICES.

Representative manufacturers give the following as fair current values for the week ending June 10. Prices are net, and they include the usual packages and delivery f.o.b., f.a.s., or f.o.r., as customary.

| Article. | Basis. | London. | North-East Coast. | East Coast, Yorks. | West Coast. | | Glasgow. |
|---|---|---|---|---|---|---|---|
| | | | | | Liverpool. | Manchester. | |
| Tar crude | per ton | — | 18/6 21/6 | 18/6 22/- | 19/- 21/3 | 19/- 21/3 | — |
| Pitch | ,, | 37/6 | 36/- | 36/- | 37/3 | 36/6 | 36/- |
| Benzol, 90% | per gallon | — | -/9 | -/9 | -/9½ | -/9½ | -/9 |
| Benzol, 50-90% | ,, | — | -/9¼ -/9½ | -/9½ | -/8¾ | -/8¾ | — |
| Toluol, 90% | ,, | — | -/9¾ -/10 | -/10 | -/10 | -/10 | -/10 |
| Crude naphtha, 30% | ,, | — | -/3¾ | -/4 | -/3⅝ | -/3⅝ | — |
| Light oil, 50% | ,, | — | -/3⅜ | -/3⅜ -/4 | -/3⅜ | -/3½ | — |
| Solvent naphtha, 90-160 | ,, | — | -/10 | -/10 | -/9¾ | -/10 | -/11 |
| Heavy naphtha, 90-190 | ,, | — | -/11 | -/11½ | -/10¾ | -/11 | -/11 |
| Creosote in bulk | ,, | -/2½ | -/2⅜ | -/2 | -/2⅛ | -/2 1/16 | -/1⅞ |
| Heavy oils | ,, | — | -/2½ -/2⅝ | -/2¼ | -/2¾ | -/2¾ | -/2⅝ |
| Carbolic Acid, 60's | ,, | — | 1/8 1/8½ | 1/9 | 1/8 | 1/7½ | 1/8½ |
| Naphthalene, crude drained salts | per ton | — | 42/6 45/- | 40/- 42/6 | 45/- | 47/6 | — |
| ,, pressed | ,, | — | 60/- | 63/- | 60/- 62/6 | 60/- 72/6 | — |
| ,, whizzed | ,, | — | — | — | 67/6 | 60/- 75/- | 60/- |
| Anthracene | per unit | -/2 | -/1¼ | -/1½ | -/1¾ | -/1¾ | — |

## NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

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